

ELx800

AND VARIATIONS

SERVICE MANUAL

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Introduction

This document is a service manual. Its purpose is to provide technical information on the assembly and function of the *ELx800* line of instrumentation. It is to be used by experienced technical personnel along with the *ELx800* Operators manual to aid in maintenance and troubleshooting of the *ELx800* instrument. If additional information is required please contact Technical Service at one of the following numbers or mail correspondence to the listed address.

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Document History

Revision	Date	Description
A	7-18-95	Release to Production
B	10-1-96	Include Daughter PCB and New Main PCB
C	8-4-98	Added 7330415 Main PCB. Included the service procedures and data sheet.

Technical Notes

This section is for periodic technical updates which are added to the manual at a later date.

- When replacing the Main PCB, R5 is of concern. If the reader is an *ELx800*, R5 is removed by cutting leads close to PCB. If the reader is an *ELx800UV* or an *ELx800NB* R5 remains installed.
- When using an *ELx800* of any variation, the power supply should be placed as far away from the reader as possible.
- When the printer is plugged into the reader before power up, the reader may hang during initialization. If this happens remove the printer cable and power up the reader, then plug in the printer.

Theory of Operation

The function of each area will be discussed in the order defined with in the table of contents in the front of the manual. Schematic diagrams as well as an electronics block diagram are included in the back of this document.

External Power Supply

The *ELx800* is designed to function from a regulated 24 volt DC power supply. It typically requires less then 1.6 amps peak to function . The external power supply provides 24 volts DC at 1.6 amps (min.) from line voltage between 90-264 VAC @ 50-60HZ. The output connector has the positive contact on the internal part of the barrel with ground on the exterior of the connector. The power supply is short circuit protected internally. Do not place the power supply close to the reader, place as far away as possible.

Internal Power Supplies

The *ELx800* internal power supplies are derived from the 24 volt DC input with the exception of the real time clock battery. This is a board mounted battery (3.5v lithium coin) which should last for 10 years

(See *Periodic Maintenance*, page 23). The power input is protected with a resetting (automatic) fuse (F1) as well as a transorb (CR2). So the input is protected from over voltage as well as reverse polarity. All voltage regulators are protected with internal (to the device) thermal protection circuits. All voltage converters are located on the main PCB.

+24 volts

This is the voltage input used as the source for all internal supplies as well as motor drive voltage. This is supplied by the external power supply.

+5 volt Logic

This power supply is a switch mode buck regulator which is used for all digital logic. U1 is the actual regulator with R1& R2 setting the output voltage. C1 and C2 are filter capacitors and L1 is the output choke. CR1 is a "catch" diode which provides a return path for the load current during the off cycle of the regulator.

V lamp

This power supply is a switch mode buck regulator which is used to power the lamp. It has an enable/disable control line which allows the main processor to switch the lamp on or off. U2 is the actual regulator with R3 and R4 setting the output voltage. This supply also has provisions to run at a different voltage for the 7330410 Main PCBs, R5 will change the output voltage to a different higher voltage (**Note:** R5 is installed on UV and narrow beam instruments; R5 is removed for plain *ELx800* readers. Damage will occur to the bulb if R5 is not used properly.) For the 7330415 Main PCBs, Jumper P1 sets the lamp voltage. Jumper P1 is removed for standard models. P1 is installed for UV and Narrow Beam versions. C4 and C5 are filter capacitors and L2 is the output choke. CR3 is the catch diode which provides a return path for the load current during the off cycle of the regulator. Visible range normal beam instruments use 3.75 volts at .5amps, UV and narrow beam instruments use 4.25 volts at 1.2amps. With R5 installed lamp voltage increases to 4.2volts.

+12Volts

This power supply is a linear regulator (U5) which converts 24volts to +12 volts. R8 and R9 set the output voltage. This +12 volt output is a source for the -12VA,+12VA and +5VA power supplies. The +12V is also used for driving the audible alarm. This is a low current power supply which under normal operation needs no heat sink.

+12VA

This is branch of the +12V supply separated by a resistor. This output is used for the source of the +5VA as well as the positive supply for some bipolar devices.

-12VA

This power supply is a positive to negative voltage converter. The supply creates -12 volts from a +12 volt source. U4 is the device which has no external resistors. C7 and C18 are essential to the correct operation of this charge pump device. This supply is used as the negative supply for bipolar devices as well as the source for the - 5VA supply.

+5VA

This power supply is a linear regulator (U7) which converts +12V in to +5.0v for use as the positive supply for the A\D converter (U9).

-5VA

This power supply is a linear regulator (U6) which converts -12VA in to -5.0V for use as the negative supply for the A\D converter (U9).

CPU

Refer to pages 1-2 of the 7330400-SC , 7330410-SC or 7330415-SC. The *ELx800* uses a 16 bit 80C186EB (U30) microprocessor which runs at 16MHZ . The clock frequency is derived from a 32MHZ crystal (U28). The power-on reset is provided via a solid state device (U29). The system has a real time clock (U40) which has an external battery (BT1 3.0 volt lithium coin).

Memory

The CPU uses a variety of memory. A block of FLASH EPROM (U49,U34 16X524288 bits) is used for storage of application programs. A smaller block of FLASH EPROM (U50,U35 16X131072 bits) is used for variable assay parameter storage. A block of STATIC RAM (U51,U36 16X131072 bits) is used for program operation storage and a block of EPROM (U52,U37 16X32768 bits) is used to store the boot up program.

Motor Drivers

Refer to page 5 of the 7330400-SC, 7330410-SC or 7330415-SC. The *ELx800* has 3 identical .45 amp stepper motor drive circuits. All three have micro step capability (1/16 step resolution). A common 2.5 volt reference is shared by all three drive circuits (U27). Each drive circuit has a D/A converter (U24,53,38) and a precision stepper motor driver (U25,54,39). The motor driver chips all have internal oscillators with external components for setting the frequency (R28 and C57 for example). Current through the each motor winding is controlled by sensing the voltage across the 1 ohm sense resistor (R31 for example) and comparing that voltage to the reference voltage output by the D/A converter. When the voltages are the same the current to the winding is shut off by a comparator internal to the motor driver chip.

X Axis

The X axis is the axis which moves the carrier left to right. This axis homes to an optical sensor mounted on the Moving Interconnect (7330401-SC) circuit board mounted on the X axis rail mount casting. The X axis motor is also mounted to the same casting. Motor drive signals are sent via the FLEX cable from the mother board to the moving interconnect circuit board. The flex cable is installed with a specific polarity see 7330005-AS. Drive motion is transmitted via a toothed belt which is attached to the carrier. The belt is automatically tensioned and needs no adjustment.

Y Axis

The Y axis is the axis which moves the carrier forward and backward. This axis homes to an optical sensor mounted in the front left corner of the base frame. The Y axis motor is mounted at the rear left corner of the base frame. Drive motion is transmitted by a toothed belt which is attached to the X-axis rail mount casting. The belt is automatically tensioned and needs no adjustment.

Filter Wheel Motor

The filter wheel is driven by a stepper motor mounted to the center of the base frame. The motor has a small gear mounted to its output shaft which engages in teeth on the perimeter of the filter wheel. The filter wheel motor is aligned when installed using jig # 7332500 (see 7330005-AS).

Light Measurement Electronics

Refer to page 6 of the 7330400-SC, 7330410-SC or 7330415-SC. The *ELx800* uses a silicon photo diode (CR6) to detect the light passing through the interference filter. The current produced in the diode is transformed to a voltage by U19. This voltage is amplified by a variable gain stage made up of U17 and U18. The variable gain stage is used to increase the signal level to the A/D (U9) so that most of the A/D signal range is used. This is necessary because each frequency interference filter passes a different amount of light. A precision voltage reference (4.50V) is used to scale the A/D (U10&1/2 of U12). The A/D (U9) is a 16 bit analog to digital converter. Data is serially output to U13 and U14 .

Display & Keyboard

Refer to pages 3 and 4 of the 7330400-SC, 7330410-SC or 7330415-SC. The *ELx800* uses a board mounted 2X24 character LCD display. The contrast of the display can be varied via RT1 on the mother board (see periodic maintenance section 6.4 for access instructions). The keypad is a membrane type non tactile switch matrix. The key pad is shielded with a conductive layer under the graphics layer. This shield has a separate conductive adhesive backed tab which is attached to the inside of the base frame of the unit. This shield is for electrostatic discharge (ESD) protection.

Output Ports

Refer to pages 3 and 4 of the 7330400-SC, 7330410-SC or 7330415-SC. The ELx800 has a 25pin Serial port as well as a 25pin parallel port located on the rear panel of the instrument. The serial port is a DTE configuration with a 25 pin (pin-male) Dsub connector. The parallel port is a 25 pin (socket-female) Dsub connector. The following pin definitions apply:

Serial Port		Parallel Port			
<u>Pin</u>	<u>Signal</u>	<u>Pin</u>	<u>Signal</u>	<u>Pin</u>	<u>Signal</u>
1	NC	19	NC	1	PSTROBE
2	TX	20	DTR	2	D0
3	RX	21	NC	3	D1
4	RTS	22	NC	4	D2
5	CTS	23	NC	5	D3
6	DSR	24	NC	6	D4
7	GND	25	NC	7	D5
8	DCD			8	D6
9	NC			9	D7
10	NC			10	NC
11	NC			11	BUSY
12	NC			12	NC
13	NC			13	NC
14	NC			14	NC
15	NC			15	NC
16	NC			16	RESET
17	NC			17	NC
18	NC			18	GND
				19	GND
				20	GND
				21	GND
				22	GND
				23	GND
				24	GN
				25	GND

BioTek # 75053 is a DB9F to DB25F serial cable

BioTek # 75049 is a DB25M to Centronix parallel cable

Optics

The ELx800 uses a single optics channel for measurement. No reference channel is used. The light from the bulb is shaped and bent 90 degrees by the optics arm. The light beam then passes through the sample and then through an interference filter mounted in the filter wheel. Light passing through the interference filter then passes through the secondary optics block to the photo diode. The photo diode produces a current which is proportional to the amount of light striking it. This current is measured by the analog front end circuit on the mother board.

Lamp

The ELx800 uses two types of lamps. Visible range instruments use a gas filled tungsten bulb which is run at 3.5volts and is on at all times. Narrow beam and UV instruments use a 4.2volt bulb which is also on all of the time. There is a simple bulb alignment procedure for each type of bulb. Refer to *Lamp Replacement*, page 23. The lamps intensity will slowly drop over time until the instruments run time self check detects a low signal level and flags the user via the display.

Optics Arm

The optics arm houses the primary optics and the lamp. The entire optics arm is factory aligned to the secondary optics. Realignment requires alignment jig # 7332503 see assembly drawing 7330500-AS. This should not be necessary in the field. The *ELx800* will be made in several different models. In addition to the normal visible range instrument there will be a UV version and a narrow beam version. These models will have different optics arm assemblies which are not interchangeable but they are aligned in the same way.

Interference Filters

The *ELx800* uses interference filters to select the desired frequency of light. These filters are mounted in the filter wheel within the filter wheel cover below the optics arm. A maximum of 5 filters can be installed at one time. All unused filter locations must carry blank filters or errors will result (error #0X500). The interference filters have a specific orientation defined by an arrow stamped on the side of the filter. The arrow should point down in the direction the light is going.

The standard *ELx800* instrument can use filters from 400 to 750 nm order # 2874XXX where the XXX is the pass frequency in nanometers.

Lower Optics Block

The lower optics block is used to collimate the beam so that it fits the photo diode in all plate reading conditions. A BG-18 (BTI# 7332001) filter is housed within the lower optics block. This filter is necessary to attenuate specific light frequency ranges. See assembly drawing 7330005-as for specific assembly information.

Plate Carrier

The plate carrier is the assembly which holds the plate to be read. It is presented to the user to the left of the display at power up. Micro plates are held in place with use of a plate retention spring. The plate carrier is factory aligned to the X-axis with jig # 7332502 see 7330005-As for specific instructions. Realignment is required if the bearing block screws are loosened. The plate carrier carries the X-Axis homing tab on the rear left corner. This tab interrupts the X-Axis opto sensor when the carrier is moved home. A grounding leaf spring is also employed to protect the instrument from Electro Static Discharge events. An anti backlash spring/roller bearing is employed to bias the carrier bearing backlash. **Carrier alignment should be verified and the bearing block retention fastener should be torqued whenever the instrument is serviced.**

Error Appendix

The following is a list of displayed error codes and what they mean. The error code is displayed as the last four digits. The instrument will still respond to keypad input to stop the beeper and return to the main menu in most cases. In cases where there are several elements such as filters or motors the right most digit will identify the element in error.

ERROR 1300

Type of error

Filter used at time of failure.

filter 1=1	motor 1 = X axis (forward /back)
filter 2=2	motor 2 = Y axis (left/right)
filter 3=3	motor 3 = filter motor
filter 4=4	
filter 5=5	

Displayed Error	Potential Cause
ERROR 0100	READ FUNCTION ABORTED
ERROR 0200	(MOTOR) COULD NOT FIND OPTO SENSOR
ERROR 0300	(MOTOR) COULD NOT FIND EDGE OF HOLE (AUTOCAL)
ERROR 0400	(MOTOR) FAILED POSITION VERIFY
ERROR 0500	FILTER WHEEL MISSING FILTER
ERROR 0600	(FILTER) GAIN OUT OF RANGE
ERROR 0700	READER FAILED NOISE TEST
ERROR 0800	READER FAILED OFFSET TEST
ERROR 0900	READ TIME (FILTER) DARK OUT OF RANGE
ERROR 0A00	READ TIME (FILTER) AIR/BLANK OUT
ERROR 0B00	INVALID (ASSAY NUMBER)
ERROR 0C00	PRINTER TIMED OUT
ERROR 0D00	CAL CHECK SUM ERROR
ERROR 0E00	FILTER WAVELENGTH SPECIFIED NOT IN FILTER TABLE
ERROR 0F00	FILTER SIGNAL OUT OF RANGE
ERROR 1000	CNFG DATA ERROR
ERROR 1100	CNFG CHECKSUM ERROR
ERROR 1200	CAL DATA ERROR
ERROR 1300	MOTOR NOT HOMED CORRECTLY (again)
ERROR A100	TASK CONTROL BLOCK NOT AVAILABLE
ERROR A200	READER FUNCTION ALREADY IN USE
ERROR A300	(DEVICE) NOT AVAILABLE
ERROR A400	FAILED CODE CHECKSUM TEST ON POWER UP
ERROR A500	DR STEPS ALLOC/FREE ERROR
ERROR A600	QUICK FLASH CONFIGURATION TIMED OUT

The following errors would occur if the axis fails to home.

ERROR 0200	X AXIS MOTOR COULD NOT FIND OPTO SENSOR
ERROR 0201	Y AXIS MOTOR COULD NOT FIND OPTO SENSOR
ERROR 0202	FILTER WHEEL MOTOR COULD NOT FIND OPTO SENSOR

Probable cause: Disconnected sensor or motor. An obstruction limiting carrier movement, such as the carrier block (a loud grinding would be heard at power up).(*Errors 0200,0201*)

Probable cause: A bad bulb.(*Error 0202*)

The following errors would occur if the expected axis move did not encounter the light beam when expected during the AUTOCAL process

AUTOCAL Error Messages

ERROR 0300	X AXIS FAILED TO FIND LIGHT BEAM
ERROR 0301	Y AXIS FAILED TO FIND LIGHT BEAM
ERROR 0302	FILTER WHEEL DID NOT FIND HOME

These errors indicate that a particular axis was moved to a point where the light beam from the optics arm was expected to be detected by the measurement electronics but was not.

Probable cause: X or Y axis cases - loose belt or loose motor pulley or bad motor drive which causes the carrier to not move where it was sent. Filter Wheel motor case - Filter wheel homing hole blocked, filter wheel drive gear loose or motor drive failure causing inadequate filter wheel movement. A bad bulb could be responsible for the filter wheel not finding the home position.

ERROR 0400	X AXIS FAILED POSITION VERIFY
ERROR 0401	Y AXIS FAILED POSITION VERIFY
ERROR 0402	FILTER WHEEL FAILED POSITION VERIFY

These errors indicate that an axis failed its position verify test. The position verify test keeps track of all axis moves so that when the axis returns home it is expected at a specific step count. If the axis gets home early (to few steps) or late (to many steps) the test fails.

Probable cause: Belt slipping cause by incorrect tension, loose motor pulley or loose belt clamp. A bad motor drive circuit.

ERROR 0500	FILTER IS NOT INSTALLED
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This error indicates that the filter wheel has an open filter location.

Probable cause: All filter locations must have either a filter or a filter blank (BTI# 2872086) installed or this error will result. If the entire wheel is not installed this error will also result.

ERROR 0601	FILTER #1 GAIN OUT OF RANGE
ERROR 0602	FILTER #2 GAIN OUT OF RANGE
ERROR 0603	FILTER #3 GAIN OUT OF RANGE
ERROR 0604	FILTER #4 GAIN OUT OF RANGE
ERROR 0605	FILTER #5 GAIN OUT OF RANGE

These errors indicate that the gain necessary to use the filter in question is out of the range necessary to assure performance to specifications.

Probable cause : A bad interference filter, missing filter or a bad lamp could cause this error. Misaligned optics could also cause this error.

ERROR 0700 READER FAILED NOISE TEST

This error indicates that the reader noise test failed. The reader noise test checks the DARK current signal level for stability. Dark current is measured with the light blocked at maximum measurement channel gain. Four groups of 96 readings are taken at 100ms intervals. This data is reduced to four averages which can not vary by 20 counts or a 0700 error will result. The out going production specification for this test is 12 counts of variation.

Probable cause: External signals getting in to the measurement circuit. The bottom and top shrouds should be correctly installed as well as the filter wheel cover. This problem in a correctly assembled unit could indicate a bad mother board (7330400, 7330410 or 7330415) or daughter board (7330404 or 7330414) , photo diode or power supply to close to unit. Failure indicates excessive variation in the dark current (background) noise levels of the measurement circuit.

ERROR 0800 READER FAILED OFFSET TEST

This error indicates that the measurement electronics dark current offset is outside of acceptable limits at maximum gain. The noise signal level must be between 144 and 2019 counts or an error will be set. Production limits are 288-1875.

Probable cause: Ambient light leak , bad mother board (7330400, 7330410 or 7330415) , daughter board (7330404 or 7330414) , photo diode or power supply to close to unit.

ERROR 0900 READ TIME DARK VALUE OUT OF RANGE

This error indicates that the dark current value taken during the current read is significantly different then the same reading taken during the power up self check.

Probable cause: The measurement electronics background noise has changed since the last power up self check. Could be caused by a large increase in external ambient light since power up.

ERROR 0A00 READ TIME AIR BLANK OUT OF RANGE

This error indicates that the blank (full signal) reading taken during the current read has changed significantly from the same reading taken during the power up self check.

Probable cause: The measurement electronics full signal level has changed since the power up self check was last run. The bulb could be near failure or the optics could be interfered with.

ERROR 0B00 INVALID ASSAY

This error indicates that an assay number that is not programmed was selected.

ERROR 0C00 PRINTER TIMED OUT

This error indicates that the printer in use is not responding

ERROR 0D00 CALIBRATION CHECK SUM ERROR

This error indicates that the stored check sum value for the calibration data does not match the actual check sum

ERROR 0E00 WAVELENGTH NOT FOUND IN FILTER TABLE

This error indicates that the specified assay wavelength is not in the filter table. If a filter is added to the filter wheel the filter table must be updated or this error will occur .

ERROR 0F00 FILTER SIGNAL OUT OF RANGE

This error indicates that the filter (1-5) has a signal which is out of range. This error could be produced by putting a UV in a non "UV" instrument. This error could also be produced by having a blank filter in a position which is programmed to actually have a filter installed. The filter table must match the filters actually installed in the filter wheel.

ERROR 1000 CONFIGURATION DATA MISSING

This error indicates that necessary configuration data is missing from memory. Which probably means it was never downloaded or it was downloaded incorrectly.

ERROR 1100 FAILED CONFIGURATION CHECK SUM TEST

This error indicates that the stored checksum value from the configuration data does not match the actual checksum of the current configuration data. This means that the configuration data has changed and the check sum stored is no longer valid. The error is produced when outdated versions (old) of Extensions or Define Assay are used to create an assay configuration file. This file is incompatible with the operation code within the instruments memory. The fix for this problem is to recreate the assay definition on the correct version of assay definition software and re-download it.

ERROR 1200 CALIBRATION DATA MISSING

This error means that AUTOCAL has not been performed after a memory erase or in the case of a new unprogrammed board immediately after the assay definition download. The system must have the AUTOCAL sequence performed. See Section 8.10 in this manual.

ERROR 1300 MOTOR NOT HOMED

This error will occur if the error 0200 or error 0300 is ignored. The situation needs to be fixed before the instrument is used.

Maintenance

Periodic Maintenance

The *ELx800* has no periodic maintenance schedule. The only area of the instrument which is expected to need replacement is the lamp. Periodic cleaning of the top surface of the base frame with a mild detergent is probably a good idea. Decontamination is also required if the unit is to be shipped and it has been in contact with possible infectious material.

Lamp Replacement

To replace the lamp follow the following instructions:

Note: For the 7330501S bulbs in the regular instrument (non UV or NB) refer to 7330522-AS

1. Unplug the instrument and flip it over on its back.
2. Remove the 4 black slotted screws which retain the top shroud
3. Flip the instrument over again and lift the top shroud off.
4. **Loosen** (do not remove) both **3/32" hex screws** which hold the lamp in place.
5. Slide the bulb out backward and disconnect it from the connector at the back of the optics arm.
6. Connect the new bulb insert the new bulb into the bulb retention springs.
7. Power up the unit. The lamp should light and the instrument will initialize. An error may or may not happen. Ignore any errors and press the stop key to stop the error (beeper).
8. To align the bulb follow the steps outlined below:
 - A. Press the UTIL key from the main menu. Press the SETUP key then press the MORE key twice. Now press the BULB ALIGN key. The carrier will move into a position which blocks the light beam.
 - B. Push the bulb forward until it stops then rotate and or swing the bulb back and forth to obtain a full circular image on the carrier surface. Tighten the bulb retention screws and check that the image is still full and round.
 - C. Power down the instrument and reinstall the top shroud.

Lamp Replacement (UV, Narrow Beam)

Note: For the 7330509 used in UV and NB instruments Refer to 7330523-AS (UV) and 7330524-AS (NB) and page 3 of 7330005-AS. The bulb gets extremely hot during this procedure.

1. Unplug the instrument and flip it over on its back.
2. Remove the 4 black slotted screws which retain the top shroud
3. Flip the instrument over again and lift the top shroud off.
4. **Loosen** (do not remove) both **phillips head screws** which hold the lamp in place.
5. Slide the bulb out backward and disconnect it from the connector at the back of the optics arm
6. Connect the new bulb insert the new bulb into the bulb retention springs.
7. Power up the unit. The lamp should light and the instrument will initialize. An error may or may not happen. Ignore any errors and press the stop key to stop the error (beeper).
8. To align the bulb follow the steps outlined below.
 - A. Press the UTIL key from the main menu. Press the SETUP key then press the MORE key twice. Now press the BULB ALIGN key. The carrier will move into a position which blocks the light beam.
 - B. Push the bulb forward leave about 1/8" of an inch clearance to the first aperture. The bulb must not touch the aperture. Rotate and or swing the bulb back and forth to obtain a full circular image on the carrier surface. Tighten the bulb retention screws and check that the image is still full and round.
 - C. Power down the instrument and reinstall the top shroud.

Real Time Clock Battery Replacement

The ELx800 has a 3.0v lithium battery which powers the real time clock circuit. In the event that the instrument fails to keep accurate time and date, the real time clock battery should be replaced. Follow the below instructions to gain access to the battery.

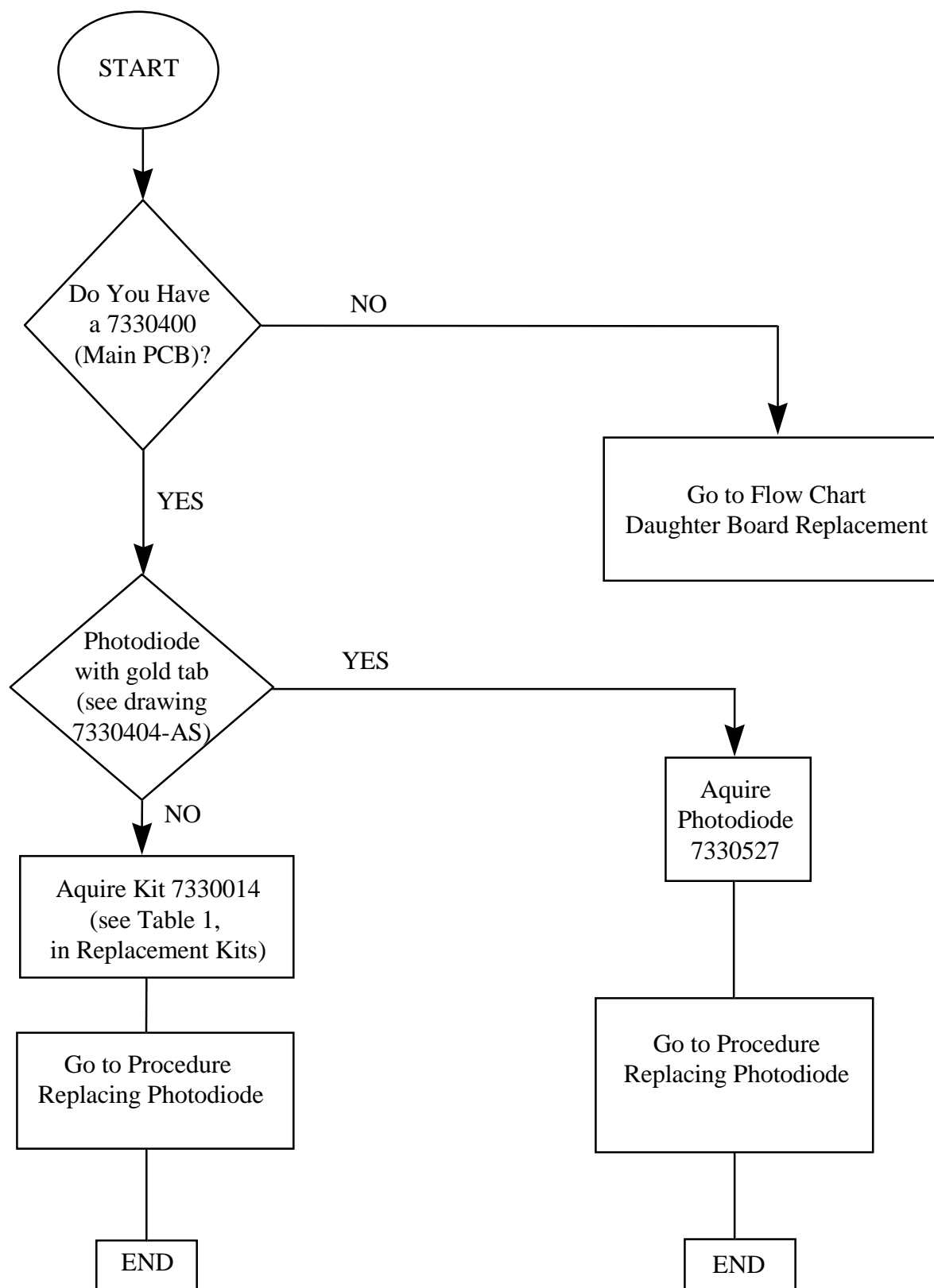
1. Turn the instrument off and disconnect the power cord. Flip the instrument on its back and remove the 4 black slotted screws which hold the top shroud. Also remove the 6 hex (9/64") head screws which retain the base pan.

2. Lift the base pan off of the instrument and set it aside. This will expose the main circuit board. The battery is along the front edge of the board. Use a small screw driver to pry it out of the battery holder. Replace the battery with a new one (BTI #47049, or Renata #CR2450N 3.0v lithium Coin). Mark the battery with the date installed so that battery age can be determined at a later date.
3. Replace the base pan and all of the screws. The black slotted screws go in the holes which hold the top shroud down, these are the ones which have a larger space between the base pan and the standoff inside. The standoffs which touch the base frame take the hex head screws.
4. The instrument should keep time correctly once the time has been set (see operators manual). If this is not the case another problem exists with the mother board.

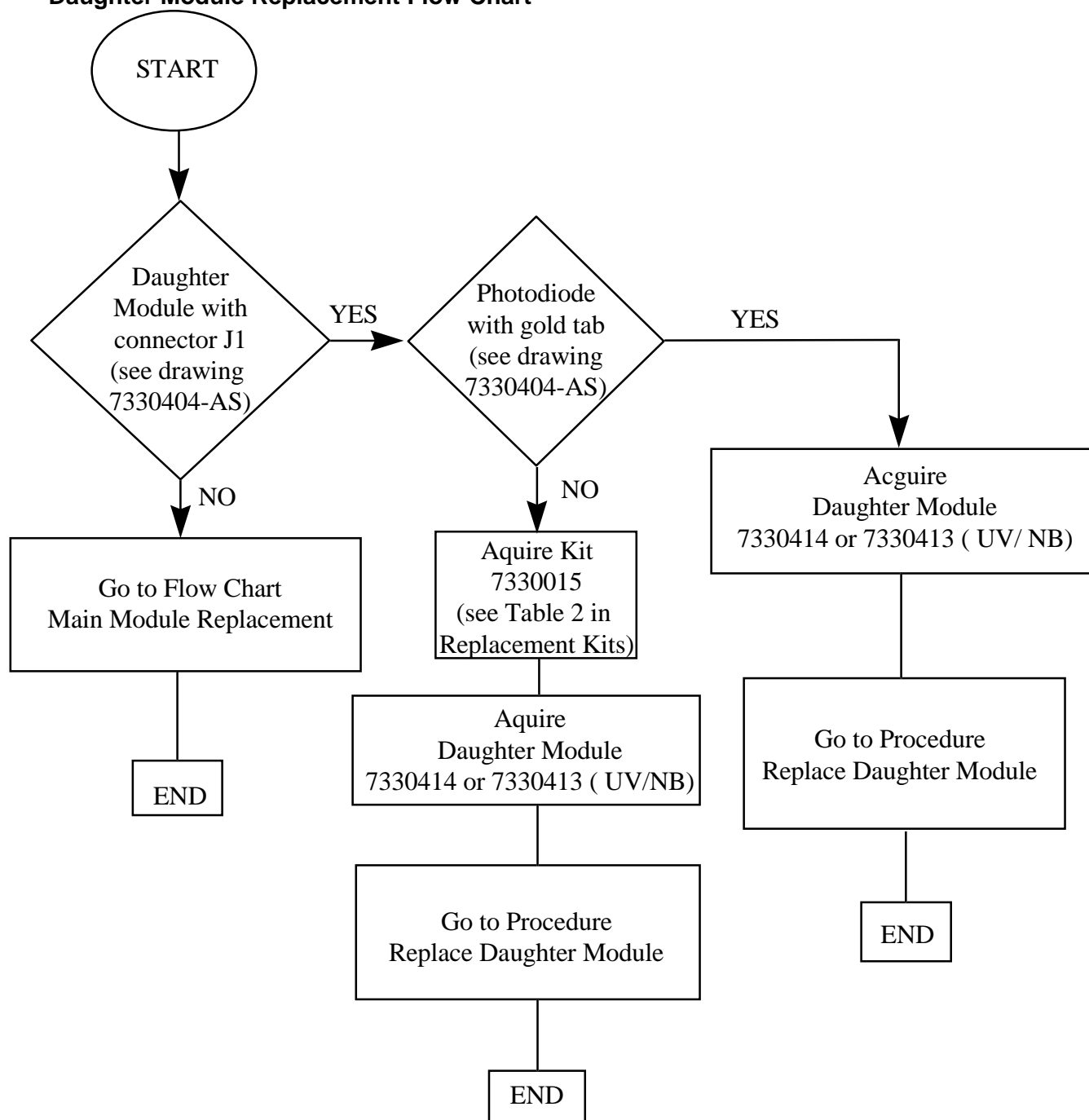
Optics/Photodiode Background

At time of printing of this manual, there are multiple optic/photo diode configurations. The original configuration had a photo diode soldered to the main board (7330400). A modification was made to place the photo diode on the daughter module (7330404,403). This was to reduce noise errors. The daughter board also has more then one configuration. The original daughter (7330404,403) module used a UDT photo diode (**Silver**). The current daughter module (7330414,413) uses a Hamamatsu T05 photo diode (**Gold**). Use the following flow charts to determine what module and kit is needed for replacement.

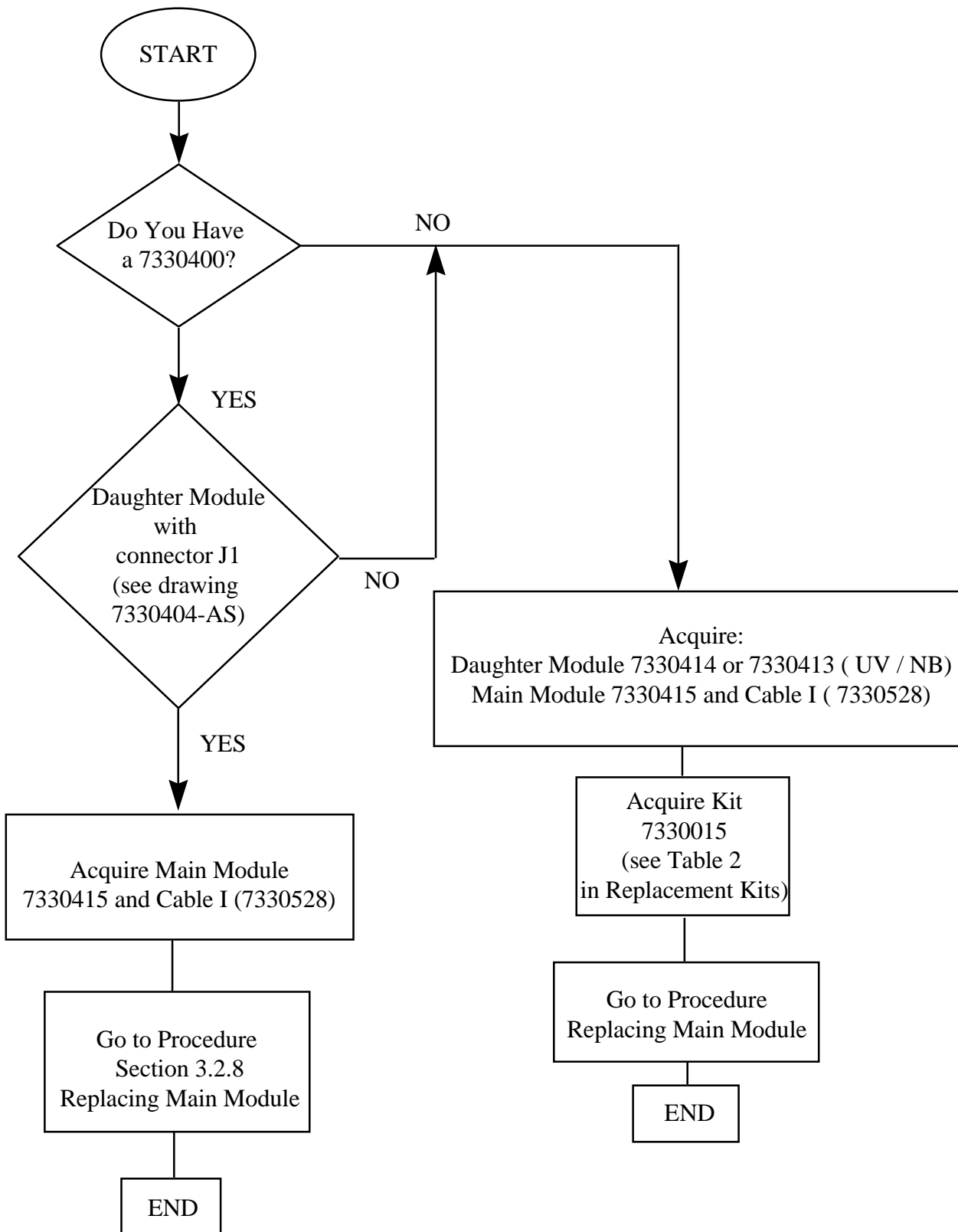
Photodiode Replacement Flow Chart



Daughter Module Replacement Flow Chart



Main Board Replacement Flow Chart



Replacement Kits

Kit for replacing Photo diode on main PCB 7330400: (Part # 7330014)		
1	7330527	Hamamatsu Photo diode with extended leads (Gold)
1	7332001	BG18 Filter (Blue glass)
1	7332084	Spring
1	7332085	Spacer ring

Table 1

Kit for installing daughter module: (Part # 7330015)		
1	7332085	Spacer ring
1	7332001	BG18 Filter (blue glass)
1	7332084	Spring
2	18038	Nylon washer
2	19189	Philip screws
2	16052	Washer .187ID, .312OD, .050THK NY
1	7331021	Daughter Module Replacement Instructions

Table 2

Kit for replacing the 7330414 module:		
2	18038	Nylon washers
2	19189	Philip screws
2	16052	Washer .187ID, .312OD, .050THK NY

Table 3

Replacing Photodiode (UDT) with Photodiode (T05).

NOTE: To accomplish this task a kit must be acquired.

1. Turn the instrument off and disconnect the power cord. Turn the instrument on its back and remove the 4 black slotted screws which hold the top shroud. Also remove the 6 hex (9/64") head screws which retain the base pan.
2. Lift the base pan off of the instrument and set it aside. This will expose the main circuit board. The photodiode is placed within the square cut out of the main board.
3. Unsolder the two leads of the photodiode. Remove the two hex screws and plastic washers. Remove the photodiode from the optic holder.

4. The internals of the optic holder must be replaced (*Refer to the drawing, **Service Replacement Optics**, supplied with the kit*). The current internals of the optics holder will include two spacers, BG18 Filter (blue glass), and a lens. The BG18 Filter and the lens will be reused. Throw away the two spacers.
5. Clean the lens and BG18 Filter. Place the lens, spring, BG18 Filter, and spacer into the optic holder in the following order:
6. Solder the T05 photodiode on the main board. This is done by taking the lead closest to the tab of the photodiode is placed in the slot marked "A" on the main board. The other lead is placed into the slot marked "C" on the main board.
7. Bend the leads at least 1/4" away from the base of the photodiode, until the photodiode is in the spacer. Use the same screws and plastic washers, to screw down the photodiode.
8. Replace the base pan and all of the screws. The black slotted screws go in the holes which hold the top shroud down, these are the ones which have a larger space between the base pan and the standoff inside. The standoffs which touch the base frame take the hex head screws.

Replacing Daughter Module

NOTE: Do not handle the new daughter module without gloves or protective covering to prevent oils and dirt from contaminating the module. This module is very sensitive to humidity and static.

1. Turn the instrument off and disconnect the power cord. Turn the instrument on its back and remove the 4 black slotted screws which hold the top shroud. Also remove the 6 hex (9/64") head screws which retain the base pan.
2. Remove the base pan from the instrument and set it aside. This will expose the main circuit board.
3. While wearing cotton gloves and being static sensitive, remove the two Philips screws and washers (if installed) holding down the daughter board, **careful** not to lose the two washers under the daughter board (if installed). Disconnect the daughter board from the main board. Install the daughter board in reverse order.

Replacing Main Module (7330400 or 7330410) with 7330415

Main Module and Daughter Module Replacement

1. Turn the instrument off and disconnect the power cord. Turn the instrument on its back and remove the 4 black slotted screws which hold the top shroud. Also remove the 6 hex (9/64") head screws which retain the base pan.
 2. Lift the base pan off of the instrument and set it aside. This will expose the main circuit board. The photo diode is placed within the square cut out of the main board.
 3. The internals of the optics holder must be replaced. The current internals of the optics holder will include two spacers, BG18 Filter (blue glass), and a lens. The BG18 Filter and the lens will be reused. Throw away the two spacers, two hex screws, and the two plastic washers.
 4. While being static sensitive, remove the main board and install the new main board as follows:
 - Disconnect all the connectors and remove the Philip screws mounting the board.
 - Remove the main board from base pan.
 - Install the new main board in reverse order.
- NOTE:** P1 is a jumper on the main board. If the reader is a standard *ELx800*, remove P1. The line voltage will be 3.75 V. If the reader is a *ELx800UV* or NB version, keep P1 shorted. This will set the line voltage to 4.25 V. (See 7330415-AS drawing, page 7 of 8.)
5. Clean the lens and BG18 Filter. Place the following into optic holder in the following order. Lens, spring, BG18 Filter, and spacer.
 6. While wearing cotton gloves, plug the current amplifier cable (7330528) into the daughter board and the main board (7330415). Place a plastic washer over both screw holes of the optic holder. Place the photodiode (of the daughter board) into spacer. Place a plastic washer on both screws and screw down daughter board. The layers should be: optic holder, washers, daughter board, washers, and screws.
 7. Replace the base pan and all of the screws. The black slotted screws go in the holes which hold the top shroud down, these are the ones which have a larger space between the base pan and the standoff inside. The standoffs which touch the base frame take the hex head screws.
 8. Perform the download procedure (page 47).
 9. Perform the Autocalibration (page 32).

Cleaning

The following guidelines can be used to clean the *ELx800* instrument. The instrument should be **turned off and unplugged before cleaning.**

Exterior surfaces- All exterior surfaces can be wiped down with a moist cloth. use a mild detergent/water solution.

Interior Surfaces (top of base frame)- With the top shroud removed the entire top of the unit can also be wiped down with a moist cloth. Use a mild detergent/water solution.

X and Y axis rails- These can be cleaned with alcohol on a cloth. This will remove any residue which may have built up over time. Do not lubricate the rails, the bearing material is self lubricating adding a lubricant would likely attract dirt and lower the rail and bearing life.

Primary Optics- The primary optics in the optics arm should not need cleaning but if it has been disassembled and the optical components have been soiled use lens paper and alcohol to clean them. Be very careful of the front surface mirror this component can be scratched very easily and this could cause a reduction in performance.

Interference Filters- The interference filters can also be cleaned with lens paper and alcohol. Be aware of the filters position and orientation and be sure to replace the filter in the same position it was in before it was cleaned. **If the positions are mixed up the instrument will use the wrong filter the next time it is used.**

Decontamination

See the operations manual for specific instructions on how to decontaminate the *ELx800* instrument.

Service Adjustments

The following is a list of adjustments which are possible on the *ELx800* instrument.

Auto Calibration

The Auto calibration process is done on every instrument which leaves the Bio-Tek manufacturing facility. Auto calibration removes the errors caused by slight differences in alignment from instrument to instrument.

The AutoCal jig is a tool which allows the *ELx800* to scan the actual location of the A1,A12, H1 and H12 microtiter well locations for a 96 well plate. These locations are then used to determine the well location map for reading a plate. If anything in the system is changed which invalidates the original Autocal information the test should be rerun to account for the new locations.

Autocal is hidden from the user. It can be run from the main menu under the test area. An Autocal jig is required to perform the alignment (PN# 7332508).

Autocal should not be needed if the unit has not been disassembled. If the Calibration Test plate shows misalignment the unit has likely sustained a shock which moved the carrier out of alignment. A complete instrument alignment check should be done to rectify what has been moved (see section 8.30-8.33).

To Run **AUTOCAL** follow the below instructions from the main menu. Use the soft keys below the display:

- **Press the UTIL key**
 - **Press the SETUP key**
 - **Press the first hidden key** (this is an unmarked key between the **CLEAR** and **ENTER** keys).
1. Insert the **AUTOCAL jig** in to the carrier with A1 in the upper left corner.
 2. Press the **READ key** (in the lower right corner of the key pad).
 3. The jig will be moved around inside the instrument and then ejected. The following (typical) report will be printed out the printer port at the end of the test.

AUTOCAL ANALYSIS

Upper Left Corner: X= 9156 Y= 10780
Lower Left Corner: X= 9148 Y= 16286
Lower Right Corner: X= 470 Y= 16290
Upper Right Corner: X= 474 Y=10782

X1 delta = 9156 - 9148 = 8
X2 delta = 470 - 474 = 4
Y1 delta = 10780 - 10782 = -2
Y2 delta = 16286 - 16290 = 6

The values are displayed as 16th steps. One whole step is .0072" so the actual coordinates of the upper left corner (A1) are as follows $9156/16 * .007" = 4.005"$ from home in the X direction and $10780/16 * .007" = 4.716"$ from home in the Y direction. These numbers represent the actual displacement from home position, not distance from the home sensor.

In production a delta of 16 is questioned as a possible problem.

When installing the AUTOCAL jig a visual check should be noted. The two carrier bearing blocks must both touch the top edge of the AUTOCAL jig and the left side of the AUTOCAL jig must fully contact the left edge of the carrier. If the AUTOCAL jig does not fit in the carrier as described the carrier is out of alignment and needs to be realigned.

The best way to check is to press the jig to the left side of the carrier and slide it forward. Both bearing blocks should touch jig at the same time.

This is most important when using a frame with microstrips because the frames are flexible and will tend to flex out of square if the carrier is also out of square. This could cause some loss of performance because the AUTOCAL locations would not exactly match those locations in the microstrip frame.

Mechanical Alignment

The following is a list of all of the critical mechanical alignments done to an *ELx800* during assembly. All of these alignment steps are called out and described in the assembly documentation in the rear of this manual. *See drawing 7330005-AS.*

Filter Wheel Motor Alignment

If a filter wheel motor is removed it needs to be aligned when it is reinstalled. This is done with jig # 7332500. *See 7330005-as page 2 for specific instructions.*

Carrier Alignment

The carrier is aligned to the carrier bearing blocks. If the carrier bearings have been moved or replaced this alignment procedure needs to be done. *See 7330005-AS, page 1 for specific instructions.* Jig number 7332505 is required for this alignment. Both bearing blocks are squared to the carrier with this jig.

Visual Check

A quick visual check of carrier alignment should be done with the AUTOCAL jig (7332508). When inserted in the carrier the AUTOCAL jig should make contact with both bearing blocks and the left side of the carrier. If visible gaps exist the carrier will need to be realigned and the AUTOCAL procedure needs to be rerun.

The best way to check is to press the jig to the left side of the carrier and slide it forward. Both plastic bearings should touch jig at the same time.

Optics Arm Alignment

If the optics arm has been moved it needs to be aligned. *See 7330005-AS, page 3 for specific instructions.* Jig number 7332503 is required for this alignment. **Autocal is required if the optics arm is realigned.**

Keyboard Overlay Alignment

If the keyboard overlay is to be replaced an alignment jig is useful to align the new replacement part to the top case. Jig number 7332501 is required for this alignment. It should be noted that the keyboard overlay will be very difficult to remove. It will be necessary to completely clean the old adhesive from the base of the instrument before application of the new overlay. If the adhesive is not completely removed the new keyboard overlay may not be reliable.

Performance Verification

Performance Verification

Several different ways exist to verify performance. The *ELx800* comes with internal checks which are available to the user to determine if the unit is in working condition.

Power-up System Test

The power up self check automatically checks signal to noise ratios for all filters in place and verifies that the gains being used are within tolerances. Failure of the power up system check indicates the unit is lacking a basic functional block. For example No bulb , No filter wheel in place or optics out of alignment could cause a power up self check error.

System Test

The system test is a subset of the power up self check which can be run anytime to verify proper signal levels from each filter. This test is accessed via the main menu screen under tests.

The following data will be printed out after the test is run.

SYSTEM SELF TEST

09:30

01/01/95

Operator ID: _____

Notes: _____

Filter : 405	Dark : 1178	Air : 59104	Gain : 16.24
Filter : 450	Dark : 1161	Air : 59528	Gain : 3.51
Filter : 490	Dark : 1162	Air : 59056	Gain : 3.94
Filter : 630	Dark : 1161	Air : 59628	Gain : 3.28

Noise Signal Range 1256-1261

SYSTEM TEST PASS

The gain values listed above are typical for the frequencies listed, significant variances are indications of system problems. Higher than normal gain values indicate low signal (old bulb, dirty optics, misalignment, marginal interference filter). Lower gain values could indicate a filter in the wrong place. For example if a 405nm filter was in position 2 and the filter table in the instrument was programmed as it appears above, the gain for the 450 filter would be 16.24 instead of 3.51 correspondingly the 405nm gain value would be 3.51 instead of 10.24 . This is a very likely problem because the customer is likely to forget to modify the filter wheel table in memory after manipulating the actual filter locations in the filter wheel.

The dark current value is the signal measured by the measurement electronics when the light is blocked by the filter wheel. If the dark current value is significantly different it is either an indication of an ambient light leak or the presence of a strong electrical noise source. Strong ambient light sources should be eliminated from the working environment. The instrument will be susceptible to both electrical and light noise with its covers (top & bottom) off. **Do not attempt to test the unit for performance unless both covers are in place.**

The Noise Signal Range test is done by blocking the light with the filter wheel and amplifying the dark signal with a programmed gain of 36. The window of acceptance is as follows. Four consecutive groups of readings are taken and averaged (4X96). The averages must fall within a 20 count window. The four readings must also be within the range of 144 - 2019 counts. Readings which don't satisfy this criteria will produce a failure.

Calibration Test Plate

Warning: The 9000547 Calibration Test Plate of Serial number XXXXX and up are valid with this instrument. Other Calibration Test plates will fail the alignment portion of the test.

The Calibration Test Plate is a tool for performance testing. It is basically a micro titer sized plate which carries optical standards as well as alignment holes. The *ELx800* has calibration test plate tests built in to its operating system. Each calibration test plate comes with N.I. S. T. traceable data for each optical standard at 8 different wavelengths. This standard data needs to be programmed in to the *ELx800* via the setup option from the main menu. When run the following report will be sent out the printer port.

CALIBRATION PLATE ANALYSIS

09:57 AM 01/17/95 Read Mode : Normal Filter: 405

Operator ID: _____ Notes: _____

Alignment Results

B2=0.000 PASS B12=0.000 PASS G1=0.000 PASS G11=0.000 PASS

	C01	D04	E02	F05	G03	H06
Standard	0.618	2.687	1.212	2.234	1.773	2.799
Data	0.624	2.737	1.221	2.256	1.790	2.867
Result	PASS	PASS	PASS	PASS	PASS	

Repeatability Results

	C01	D04	E02	F05	G03	H06
READ 1	0.624	2.737	1.221	2.256	1.790	2.867
READ2	0.624	2.747	1.222	2.262	1.793	2.885
RESULT	PASS	PASS	PASS	PASS	PASS	

The standards for six filters were programmed in to the instrument.

Alignment- The Alignment data indicates that the light beam was not cut by the alignment hole. This means that the instrument is in alignment. Readings in the alignment wells of more than .008 counts indicated misalignment during production . Errors are flagged for the user at .015 counts. A perfectly aligned instrument would have 0.000 in all four corners.

Accuracy/Linearity- The standard and the actual data are compared for an accuracy/linearity check The *ELx 800* is specified to 2.500 abs @ 405nm so above these values will not flag an error. For values below 2.500abs a composite tolerance is used to determine compliance to advertised specifications.

Accuracy of <i>ELx800</i>	+/-1% +/-0.010abs
Accuracy of Standard measurement device	+/-1%
Error in measurement position of glass	+/-0.010abs

The instrument must measure the standard within +/-2% +/-0.020 abs

This is the criteria used to determine a pass/fail result. In production, we use a +/-1.5% +/-0.015abs to determine a pass/fail result.

Repeatability- The plate is read twice during the test. The second read is compared to the first read and the following specification is applied to determine a pass/fail result.

Repeatability of the *ELx800*

+/- .5% +/- .005abs

In general, the test plate tool is only as good as the tool is maintained. A dirty plate will provide data which reflects the debris on the glass. Keep the plate in its protective packaging.

The data given over 2.500abs is worth considering. Even though the performance in this area is unspecified, repeatability suffers first at the higher optical densities because the measurement signal is small. If a reader was repeatable at 2.800abs and then changes, it is a good indication of something changing. Production tolerances are a flat +/-5% variance between the standard and the actual data taken. This is almost never a problem although some 405nm filters have enough center band variance to produce differences of close to this magnitude in the 3.000abs area.

Verification of Performance Using Liquid Test Methods

The following sets of tests are valid methods of assuring instrument performance with common materials. These tests when done carefully can test repeatability, accuracy and linearity. It should be noted that unless good laboratory practice is applied to these tests they will be of little value.

The following equipment and process can be used to create a microplate for testing

Equipment Required

- Distilled water
 - Pipette
 - Yellow food coloring (Example: Durkee™ yellow food coloring, .3 oz. bottle)
 - Flat-bottom micro plates (Example: Costar™ #3590)
 - Tween™ 20 (polyoxyethylenesorbitan Monolaurate)
 - Beakers
 - Rack of 10 test tubes (10 ml minimum volume)
1. Create a 0.5% solution of Tween 20 and distilled water. As an example, add 1 ml of Tween 20 to 200 ml of distilled water. Shake well for several minutes.
 2. Add 6 drops of yellow food coloring to the 200 ml of the 0.5% Tween solution. This should give an Absorbance of 1.4 to 2.0 Absorbance units when using 200 µl in the well. If you wish to attain an Absorbance up to 3.0 OD, add 3 additional drops of food coloring (a total of 9 drops). This solution should be read at 405nm in a 200 µl volume to verify that it actually absorbs as expected. Add more food coloring to increase the density or add distilled water to lower the density. 200 µl of this fluid should have a density which is the highest Absorbance to be tested.

3. Set up a rack containing 10 tubes, numbered consecutively. Perform a percentage dilution, beginning with 100% of the original dense solution in the first tube, 90% of the original solution in the second tube; 80% in the third tube, all the way to 10% in the last tube. Dilute using amounts of the remaining 0.5% solution of distilled water and Tween 20, as shown in Table 8-2.

Table 8-2
Test Tube Dilutions

Tube Number	1	2	3	4	5	6	7	8	9	10
Volume of Original Solution (ml)	20	18	16	14	12	10	8	6	4	2
Vol. Water +0.5% Tween Solution (ml)	0	2	4	6	8	10	12	14	16	18
Expected Absorbance if original solution is 2.0 at 200 μl	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
Concentration	1	.9	.8	.7	.6	.5	.4	.3	.2	.1

4. Remove 200 μ l of liquid from each tube, and dispense it into the appropriate microplate well. There should be enough solution to have several replicates, if desired.

Note: A variation on this method can be done right in the microplate instead of using test tubes. Simply use an 8 channel gang pipette to pipette the distilled water directly into the wells, then change the tips and dispense the absorber directly into the wells. This method allows 12 different concentrations across a 8 X 12 plate. The same pipette should be used for all pipetting to eliminate errors from two different pipettes. A 25 μ l-200 μ l pipette will easily allow concentrations of 1 to 0 in .125 steps to be created right in the microplate.

Distilled Water Vol.	200	175	150	125	100	75	50	25	0
Absorber Vol.	0	25	50	75	100	125	150	175	200
Concentration	0	.125	.25	.375	.5	.625	.75	.875	1

5. Allow the plate to stabilize for about 10 minutes covered (orbital shaking helps). The plate is now ready to read in the reader at 405nm. One or all of the following tests can be run with the prepared plate.

Repeatability (specification $\pm 5\% \pm .005\text{abs}$) @ 405nm to 2.00abs

1. Read the microplate using a single wavelength, no blanking (or blank on air), and an 8 x 12 matrix format.
2. When the readings have printed out, read the microplate a second time.
3. Compare the readings.
Each well in the first printout should be within $\pm 0.5\% \pm .005\text{abs}$ of the of the same reading in the second printout.

For example, A1 in the first printout should be within $\pm .5\% \pm .005\text{abs}$ of A1 in the second printout. If A1 was initially 1.000 OD, then subsequent readings should be between .990 OD and 1.010.

Alignment test (specification $\pm 1\% \pm .010$) @ 405nm to 2.00abs

1. Turn the microplate described in the Repeatability section around and read it again.
2. Compare the printout with the last printout from the repeatability test.

Be sure to compare the readings from the same wells. Remember that well A1 is now in the H12 position. The readings should be within 1% of the OD., and 0.010 counts of each other.

For example, if A1 was initially 1.000, then the "turn-around" test should show results in the H12 position of between .980 OD and 1.020 OD.

Linearity & Accuracy Test ($\pm 1\% \pm .010$) @405nm to 2.00abs

1. Read the microplate using a single wavelength (405nm if yellow dye is used), blank on the 0 concentration column (or blank on air), and an 8 x 12 matrix format.
2. When the data has printed out graph the Absorbance verses the concentration. The data should produce a straight line. The graph can be done manually or the data can be imported in to a spread sheet program and graphed with a computer. When using a spread sheet program a theoretical best fit line can be derived from the data using a least squares linear regression. This theoretical line can have the instruments linearity specification applied to it to derive a set of limits which the original data should fall with in.
3. Data which produces a flat line which rolls off above 2.00 abs is normal. Data which produces a flat line which rolls off under 2.00 abs indicates nonlinear instrument performance. In the event that nonlinear data is produced, the whole test should be run again to verify the results. If possible, the data should be checked on a similar instrument to make sure that the problem is

in the reader and not the solutions being measured. It should be noted that nonlinear response could be caused by one or more of the following things.

- Very strong ambient light sources shining into the carrier top case opening.
- Weak bulb. This should be flagged by a run time self check error.
- Use of a filter outside of the instruments specified operation range.

Software Configuration Verification

With the introduction of Assay definitions downloaded from a PC the need for determining if the assays loaded are the ones which we really want in the version of the *ELx800* we are setting up. If a foreign language was downloaded, the display should now reflect the appropriate language.

From the UUT Main Menu, press the **Util** soft key. Press the **Tests** soft key, then press the **Chksum** key. A revision level and part number will appear on the display, as will the code checksum. Compare these against 7330202-SP version and checksum. On the second display, version and part number of assay/config download will be displayed. They should match 733XXXX-SP version number. Refer to the BOM for proper -SP. Record the versions and revisions and checksums on the data sheet.

Instrument Setup

Setting DATE / TIME

Compare the displayed time and date to the correct time and date. If they are correct skip this step and go to Step 5. If they are wrong, they must be set.

To set the time, press the following soft keys just below the display of the UUT:

- ➡ **Press the UTIL soft key.**
- ➡ **Press the SETUP soft key.**
- ➡ **Press the TIME soft key.**
- ➡ **Press the 12HOUR soft key.**

Use the numeric keys on the UUT to set the time. Press **ENTER** when the date is input.

To set the **DATE**, press the following soft keys just below the display of the UUT:

- ➡ **Press the DATE soft key.**
- ➡ **Press the MMDDYY soft key.**

Use the numeric keys on the UUT to set the date. Press **ENTER** and then the **MAIN MENU** key when the date is input. The Main Menu should display the correct time.

Time Check

Make a note of the time at this point in the process. The system clock is now set and should keep time correctly. At the end of the procedure we will look again at the time and make sure that it is correct.

Filter Table Setup

The unit, as downloaded, will have a set of default filter values programmed in its internal filter table. They are as follows:

POS 1	405
POS 2	450
POS 3	490
POS 4	630
POS 5	000 or (340 in UV instruments)

If the filters installed are different than the default values in the filter table, the instruments memory will need modification. Follow the instructions below to verify or modify the table. From the Main Menu screen:

- ➡ Press **UTIL**
- ➡ Press **SETUP**
- ➡ Press **FILTER**

Use the "Numeric keys" to modify the value, or press **ENTER** to select the displayed value and move to the next filter value. After all 5 locations have been verified, press the **MAIN MENU** key to get back to the Main Menu.

Time Verification

Check the time displayed at the Main Menu. It should match whatever clock the instrument was set to. Verify that the times printed on the Data Sheets accurately indicate the time elapsed between tests. Make a Data Sheet entry.

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Bio-Tek Instruments, Inc.

Model: **ELx800 and Variations**

Procedure: **7330005-ST**

Title: **Final Asby Service Test Procedure**

Rev	Description of changes	ECO	Date
A	Release To Production	29167	04/30/97
B	Added blank carrier, changed gain	30814	07/09/98

Equipment Required

Bleach

IBM compatible computer

KCJR, KC3 or equivalent

Serial cable (P/N 75053) or equivalent

Parallel cable (P/N 71072) or equivalent

Parallel printer

Calibration plate (P/N 9000547)

Auto cal jig (P/N 7332508)

Shipping accessories:

Screws qty 2 (P/N 19337) or equivalent

Stopping block (P/N 7332041)

Rubber band (P/N 99204) or equivalent

Screw driver (P/N 98145) or equivalent

Bunge cord (P/N 49746) or equivalent

Shipping document (P/N 7331006)

Lab tape

Operators Manual (P/N 7331000)

Service Manual (P/N 7331005)

Final assembly data sheet (P/N 7330005-DS)

Field software download procedure (P/N 8291007)

Procedure

1. Perform the decontamination procedure in the Operators manual (Appendix A).
2. List all accessories sent with unit. If unit was not shipped with all the shipping accessories, list discrepancies on IR.
3. At the main menu select **"Util"**, **"Tests"**, then **"CHKSUM"**. Record the Base code and Assays. The EPROM is displayed on power up.
4. Remove the top cover. Remove the cover over the filter wheel. Remove the filter wheel. **Do not turn over or use fingers.** Gently push up the filters to reveal the filter designations. Record the filter wavelengths. Reinstall the removed items.
- 5.
6. At the main menu select **"Util"**, **"Setup"**, then **"Filter"**. Record the programmed filter locations.
7. At the main menu select **"Util"**, **"Setup"**, **"More"**, then **"RS232"**. Record the Baud rate.
8. At the main menu select **"Util"**, **"Output"**. Record the output status.

9. Perform a self test. Refer to the operators manual and the service manual for directions.
10. Perform a calibration test at 405nm. Refer to the operators manual and the service manual for directions.
11. Skip this test if there is no reported problems.
12. Perform the cleaning section of the Service Manual. In addition to the manual, use lens paper to clean the lower lens on the base assembly. Use NOVUS Plastic polish #2 to clean the rails.

Perform the carrier alignment and the optic arm alignment steps within the service manual.

Perform the bulb alignment within the Operators Manual. If more than 10% of the circular light beam is blocked out, and can not be adjusted, replace lamp.

13. Conduct necessary repairs.
14. Perform all FCN's
15. Check all the hardware for tightness. Replace broken, rusted, or missing parts.
16. If downloading is not required skip this step, otherwise perform 8291007-AW.

To find the Download Utility version, start the Download utility. Pull down the "?". This will reveal the Download Utility version. The part number and revision are found on the Download Utility diskettes. Verify current revision with document control, or ISIS.

The new base code and assay part numbers, revisions and versions are found on the diskettes. Verify current revision with document control, or ISIS.

17. Perform the auto cal section of the Service Manual.
18. Repeat steps 6 and 7 of this procedure.
19. Use the operators manual to perform this step. Computer control is optional.
20. Verify serial port performance. Task the reader to perform a read and send data back to the IBM compatible computer. Use Appendix B in the Operators Manual to guide you.
21. Set serial port and computer controlled parameters back to original settings.
22. Ensure all accessories noted are sent back with unit.

For BTI demo units, complete the demo checklist.

23. When service has been completed, install the shipping accessories described by the shipping instruction document 7331006. Use Lab tape, to tape the screwdriver and instructions onto the instrument.

This completes the service procedure.

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Bio-Tek Instruments, Inc.

Model: **ELx800 and Variations**

Procedure: **7330005-SD**

Title: **Final Asby Service Data Sheet**

Rev	Description of changes	ECO	Date
A	Release To Production	29167	04/30/97
B	Added blank carrier, changed gain	30814	07/09/98

Technician: _____ Date: _____

Model: _____ Serial#: _____ IR: _____

1. Decontaminate unit and tag to indicate status.(√) _____

2. List accessories: _____

3. Record the following before servicing:

Base Code _____ Ver _____ EPROM _____

Assay _____ Ver _____

4. Filter locations: W1 _____ W2 _____ W3 _____ W4 _____ W5 _____

Programmed: W1 _____ W2 _____ W3 _____ W4 _____ W5 _____

5. Record serial port parameters. **1200 2400 9600**
Record the report output status **Print Computer Both**

Note: For any of the following steps, attach all printouts to IR.

6. Perform a self test.

See the 7330005-DS for the self test **PASS / FAIL** criteria's.

Does the instruments PASS? **yes / no**
If **No** do not fix at this time, report discrepancies on IR.

7. Calibration Plate Test:

See the 7330005-DS for the calibration plate **PASS / FAIL** criteria's.

Does the instrument PASS?

yes / no

If **No** do not fix at this time, report discrepancies on IR.

8. Duplicate customers complaint.

If **No** Contact customer and/or Service Engineer.

Was the complaint duplicated?

yes / no

9. Clean mechanical and optical assemblies.

Align if necessary.

Was any of the alignments changed?

yes / no

10. Conduct necessary repairs.

Was any repairs performed?

yes / no

11. Perform all FCN's (√)_____

12. Check all the hardware for tightness. Replace broken, rusted, or missing parts. (√)_____

13. If customer approves or if the software is required to be updated, Record the new software. Otherwise skip this step.

Download
utility

_____ Ver_____

Base Code

_____ Ver_____

Assay

_____ Ver_____

14. Perform Auto cal.

See the 7330005-DS for the auto cal **PASS / FAIL** criteria's.

Does the unit pass Auto cal?

yes / no

15. Repeat steps 6 and 7.

Does the unit pass both steps?

yes / no

16. Perform the following with all the filters received with the instrument:

Blank carrier test $\geq 405\text{nm}$

Blank carrier test $< 405\text{nm}$

Accuracy test $\geq 405\text{nm}$

Repeatability test $\geq 405\text{nm}$

Turnaround test $1\% \pm 0.010$

Do all the filters pass?

See 7330005-DS for specs.

0.000 ± 0.003

See operators manual for specs

See operators manual for specs

yes / no

17. If step 16 was not performed with an external computer, perform a read using an external computer.
Other wise skip this step.

Does the unit pass this step?

yes / no

18. Set serial port and computer controlled parameters to original settings. See step 5.

(√) _

19. Ensure all accessories noted accompany unit.
(For BTI demo units, complete demo checklist.)

(√) _

20. Install the following shipping accessories.

Stopping block (P/N 7332041)

Screws qty 2 (P/N 19337) or equivalent

Rubber band (P/N 99204) or equivalent

Screw driver (P/N 98145) or equivalent

Bunge cord (P/N 49746) or equivalent

Shipping document(P/N 7331006)

Are all the shipping accessories installed?

yes / no

21. This is the end of the data sheet.

ELx800 Data Sheet

Technician:_____Date:_____

Model:_____Serial#:_____IR#_____

Section 1 Alignment/Setup:

Revision EPROM _____(marked on U37 and U52 on main PCB)

Optics Aligned _____

Bulb Aligned _____

Pos	Filter
1	_____
2	_____
3	_____
4	_____
5	_____

Section 2 Download/Testing:

Base Code Loaded_____REV_____VER_____

Assay Definition Loaded_____REV_____VER_____

TIME CHECK

PASSED_____

Self Check:

Printed gain values must be over 1.70 for all filters installed.

405nm gain values must not exceed 20.00. 340nm System Test AIR less DARK must be more than 16000** Noise Signal range (difference between two numbers) must be less than 12 counts. Both Noise Signal range numbers must be between 288-1875.

NOTE: ** Only UV instruments

PASSED_____

AUTO CAL:

Each Printed Delta must be +/- 32 counts for shipment

Delta 1 = _____ Delta 3 = _____ **PASSED** _____
Delta 2 = _____ Delta 4 = _____

Calibration Plate Test

Alignment values must be under .008 counts for shipment

Note: Printout may indicate “PASS” even though Unit fails this Specification

B2 = _____ G1 = _____ **PASSED** _____
B12 = _____ G11 = _____

SHIPPING PREP

Shipping Block installed _____

Top Shroud & Bottom pan installed _____

Rubber Band & Shock cord installed _____

Instructions and tool attached per print _____

Download

Bio-Tek Instruments, Inc.

Model: *ELx800*, ELx808 and all variations of each.

Procedure: 8290206-ST

Title: Field Software Download Procedure

Rev	Description of changes	ECO	Date
A	Release to Production	27679	07/16/96

Equipment Required

- A PC (386) with a 1.44 MB 3.5" floppy drive, 1 COM port (minimum), mouse and 4 MB RAM
- Windows 3.1 or Windows '95 installed on the above PC
- Serial Cable
- 8290206-FW Download Utility
- Reader Basecode and Assay Configuration Software Diskettes (see Background Information, below)

Background Information

Note: We may refer to the *ELx800* or ELx808 autoreaders as the "reader" throughout this procedure

The *ELx800* and ELx808 (all models) have two "levels" of software installed on board.

- 1) The *basecode* software and
- 2) The *assay configuration* software

All *ELx800* readers have the same *basecode* software, part number 7330202-FW.

All ELx808 readers have the same *basecode* software, part number 7340201-FW.

The *assay configuration* software part number is dependent on the model of the reader. See the attached software sheet for current part numbers. Contact Bio-Tek Instruments to obtain current software revisions and versions.

These two levels of software are loaded into the readers memory via a computer connected to the serial port of the reader. This procedure explains the process for downloading both the basecode and assay configuration software onto an *ELx800* or *ELx808* reader. The basecode is downloaded first, followed by the assay configuration files.

Note: When updated software is downloaded onto the reader, any open assays that have been programmed on board the reader will be erased and will have to be re-programmed. Please print the assay definitions before downloading new software. To do this, attach a printer to the parallel port of the reader, choose REPORT from the main menu on the reader, then press ASSAY and choose the programmed assay definition to print. This printout will detail all assay parameters, *except* any formulas which may have been defined. (The formulas are printed as part of the assay results report printout; refer to a hardcopy of an assay results report, or step through the define formula section from the front keypad to obtain the formula definition).

Procedure

1. Connect the reader **serial port** to the computer **COM port**, using the 75053 cable. *(If your computer has a 25-pin COM port, it will be necessary to attach a 9-pin to 25-pin adapter to the computer end of the cable).*
2. Turn the computer and reader ON.
3. Basecode Download:
 - Insert the basecode software diskette (7330202-FW or 7340202-FW) into the computer's floppy drive.
 - Get to the DOS a:\> prompt (or appropriate floppy drive prompt).
 - On the reader, press the **Shift** and **Hidden Key #1** *simultaneously*. (Hidden key #1 is between the 'CLEAR' and 'ENTER' keys).
 - The reader display should read **"START CODE DOWNLOAD?"**

YES**NO**

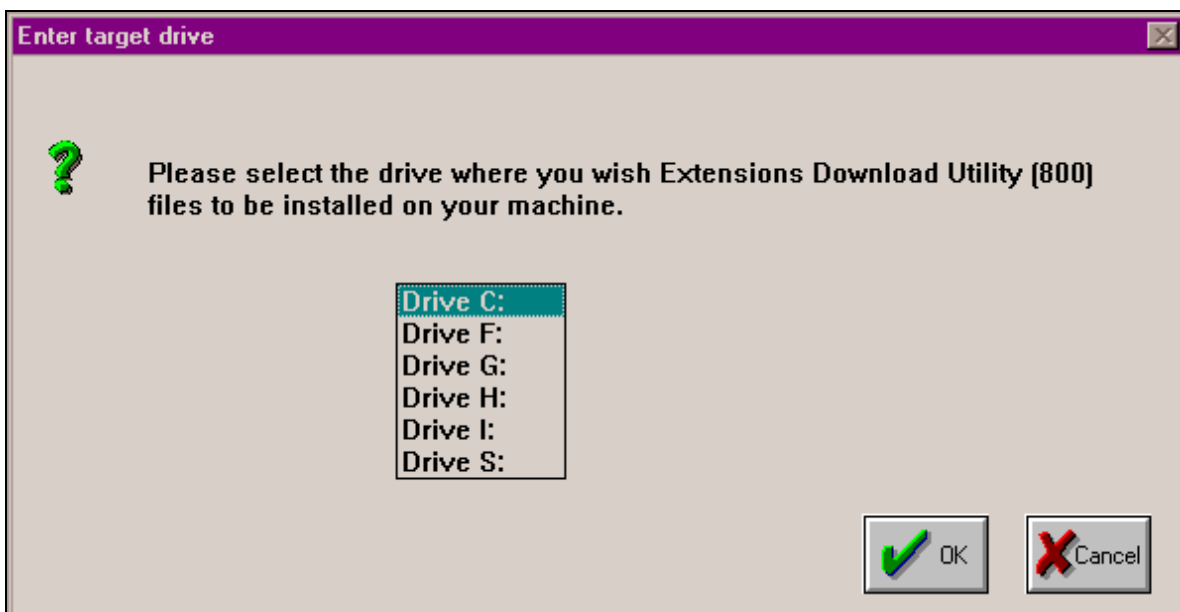
IMPORTANT: To properly load the basecode software, the above message **MUST BE** displayed on the reader. If "START ASSAY DOWNLOAD" is displayed, press NO and repeat step 3.2, making certain that the correct Hidden Key is pressed.

- Select **YES**. The reader display will read **Clearing Download Area**, then **Ready for Download**.

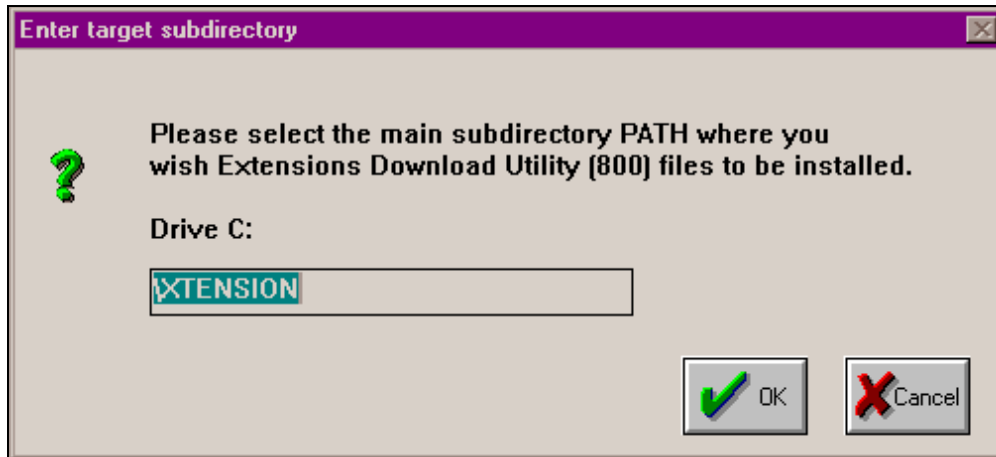
- At the computer DOS prompt, type **DLOAD** and press **Return** . The reader display will read **DOWNLOAD IN PROGRESS**.
- The computer will display: **File size: 3000513 (may vary)**
Bytes sent: xxxxxx (will be counting up)
- The download will take several minutes. When complete, the computer will display **DOWNLOAD SUCCESSFUL!** The reader will display **START ASSAY DOWNLOAD**, which indicates that the assay configuration files must now be downloaded. Remove the basecode diskette from the floppy drive.

4. **ASSAY CONFIGURATION DOWNLOAD-** This download is performed using the Download Utility Program, part number 8290206-FW. Start Windows 3.1 or Windows '95 on the computer.

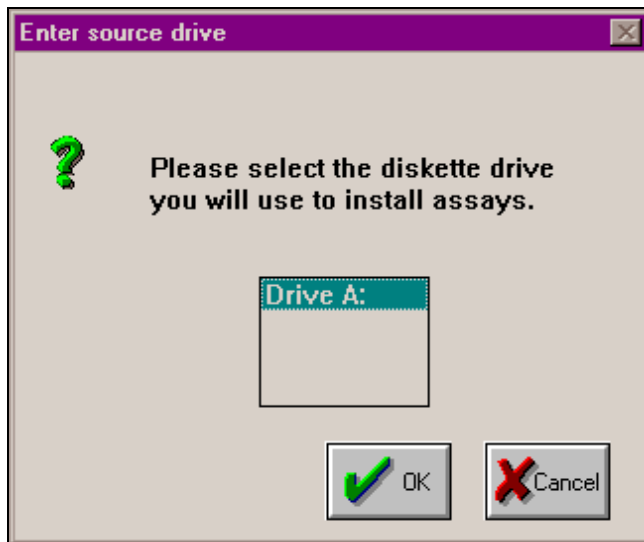
- Install the Download Utility via File Manager or Windows Explore.(Double click on the Download Utility's *Winstall.exe* file)
- The install program will ask several questions - it is highly recommended that the user accept all the default settings in the installation process. Once the Winstall.exe is begun, you will see screens similar to those shown below:



- Select C: to install the Download Utility onto hard drive C:



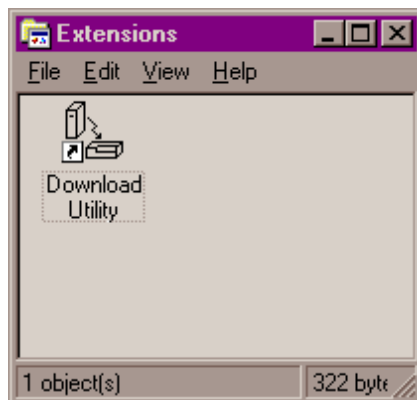
The Download Utility will be installed in subdirectory C:\XTENSION, unless a different subdirectory name is entered.



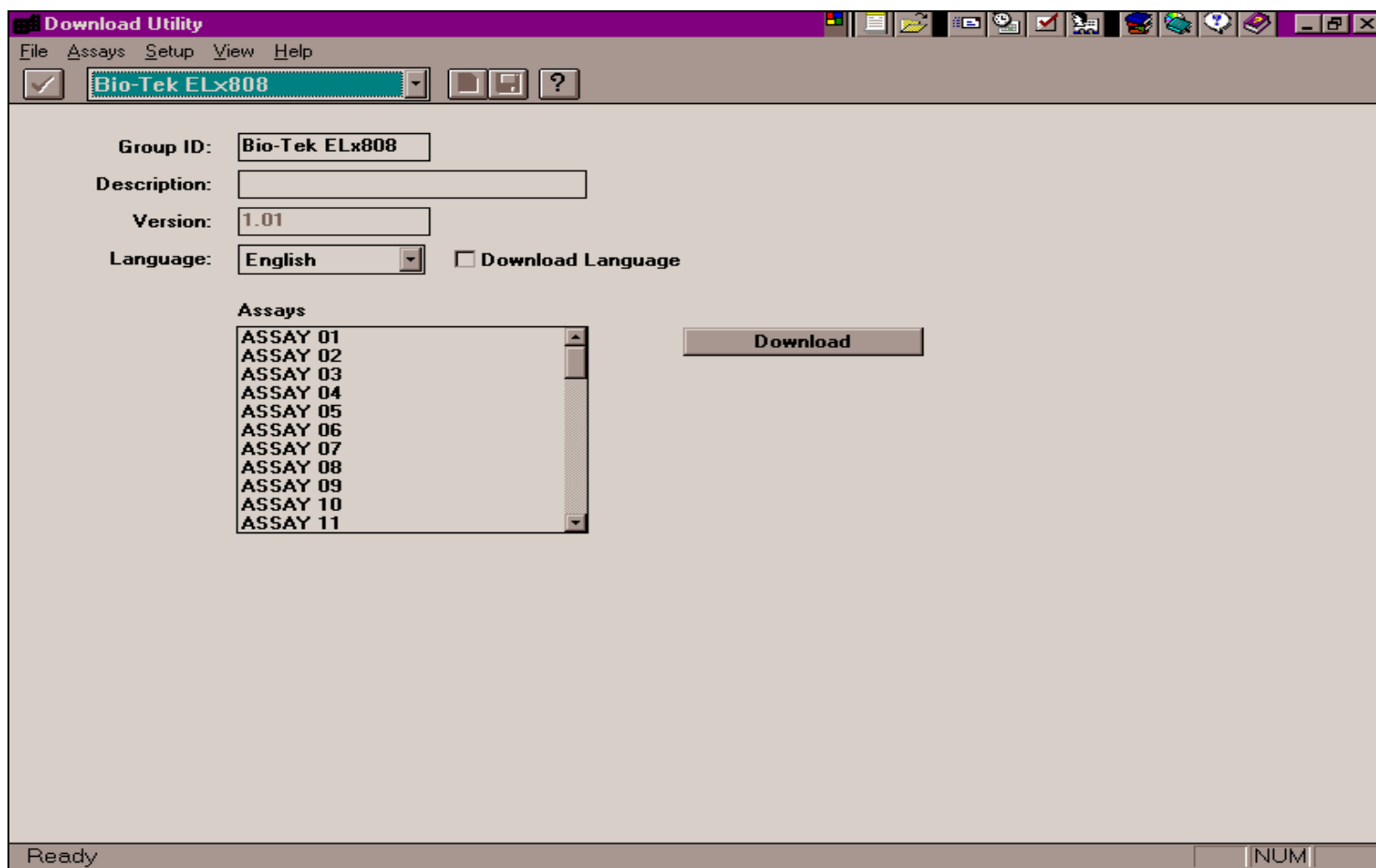
The assay configuration files will be installed from a floppy diskette in drive a: (other floppy drive designators may be available at this screen). It is recommended that the assay configuration files be loaded from a floppy drive.



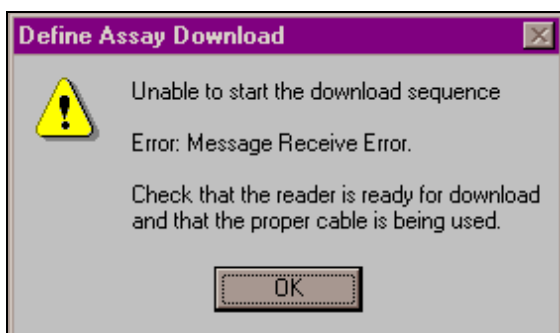
- The Download Utility files are being loaded. In most cases, there is only one Download Utility disk.
- When the installation of the Utility is complete, an ICON similar to the icon below will be seen in Windows 3.1 or Windows '95. Remove the Download Utility diskette from the computer's floppy drive and insert the appropriate ASSAY CONFIGURATION diskette into the floppy drive.



- The reader display should still read **START ASSAY DOWNLOAD**. Double click on the Download Utility Icon. The floppy drive should become active while the application is initializing. The following screen (or similar) should appear on the computer:



- The Group ID will be either *ELx800* or *ELx808*, depending on the Assay Configuration software being installed. The assay names may vary as well, if the Assay Configuration files have been customized by Bio-Tek. For most users, the assay names will appear as Assay 01- Assay 55.
- Select the **DOWNLOAD** button. The Assay Configuration download will begin. If the reader and computer are not properly connected, or if the reader display does not read **Start Assay Download**, the following message window may appear:



- √ Check that the cable is connected between the computer and the SERIAL port of the reader.
- √ It may be necessary to check/change the configuration of the serial port in the Download Utility (under Setup - Serial Port).

If the reader does *not* display **Start Assay Download**, press the **Shift** and **Hidden Key #2** *simultaneously* (Hidden Key #2 is between the 'Main Menu' and 'Previous Screen' keys.). The reader should display **:START ASSAY DOWNLOAD?**

YES NO

Choose YES, then double click on the **DOWNLOAD** button in the Download Utility and start the process again. After the assay configuration download is complete, the reader will re-initialize and return to the Main Menu. Check that the current software is loaded onto the reader by pressing **UTIL, TEST, CHKSUM**. The reader display will scroll through the seven digit part numbers and versions of both the basecode and assay configuration part numbers. Check them against the list at the end of this procedure. The software update is complete .

SOFTWARE PART NUMBER LIST

Proprietary *ELx800*, ELx808 Software Information

	Basecode P/N	Assay Config P/N
<i>ELx800</i>	7330202-FW	7330203-FW
<i>ELx800NB</i>	7330202-FW	7330209-FW
<i>ELx800UV</i>	7330202-FW	7330208-FW
<i>ELx800G</i>	7330202-FW	7330211-FW
ELx808	7340201-FW	7340202-FW
ELx808R	7340201-FW	7340202-FW
ELx808I	7340201-FW	7340202-FW
ELx808RI	7340201-FW	7340202-FW
ELx808U	7340201-FW	7340202-FW
ELx808RU	7340201-FW	7340203-FW
ELx808RIU	7340201-FW	7340203-FW
ELx808IU	7340201-FW	7340203-FW
ELx808GU	7340201-FW	7340207-FW
ELx808GIU	7340201-FW	7340207-FW
ELx808G	7340201-FW	7340208-FW
ELx808GI	7340201-FW	7340208-FW

Drawings/Bill of Materials for Main Board with Photodiodes

Assembly Drawings

The following drawings are the assembly documentation used to assemble the *ELx800* and its variations. These drawings are subject to change.

7330005-AS FINAL ASBY

Schematic Diagrams

The following are the schematic diagrams describing the electrical circuits within the *ELx800* and its variations. These are subject to change.

7330400-SC MAIN PCB ASBY

Bill of Materials

The following are the bills of material used in building the *ELx800* and its variations. These documents are also subject to change.

7330002	Shipping accessories
7330005	Final assembly
7330400	Main PCB assembly

BILL OF MATERIALS REPORT

PART: 7330002

DESC: SHIPPING ACCESSORIES

29-Jun-1995

Page 1

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7331000	1.00	OPERATOR'S MANUAL <i>ELX800</i>	A	
94075	1.00	SHIPPING DOCUMENT KIT	C	

BILL OF MATERIALS REPORT

PART: 7330005
 DESC: FINAL ASBY
 29-Jun-1995
 Page 2

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
2872086	1.00	DUMMY FILTER	B	IN POSITION 5
2874405	1.00	FILTER ASBY 405NM READER	C	IN POSITION 1
2874450	1.00	FILTER ASBY 450NM READER	B	IN POSITION 2
2874490	1.00	490NM READER FILTER ASBY	B	IN POSITION 3
2874630	1.00	FILTER ASBY 630NM READER	B	IN POSITION 4
49767	1.00	STRAP W/BUCKLE 6FT LONG 1.5"W	A	
7330005-AS	0.00	FINAL ASBY	F	DOCUMENT ONLY
7330005-TP	0.00	FINAL ASBY		DOCUMENT ONLY
7330400	1.00	MAIN PCB ASBY	G	
7330500	1.00	GENERIC FINAL KIT	F	
7330512	1.00	OPTIC ARM ASBY	B	
7330515	1.00	CARRIER ASBY	A	
7331001	1.00	OVRLY KEYBOARD X-Y READER	C	
7331003	1.00	OVRLY FRONT	A	
7331006	1.00	LABEL UNPACKING INSTRUCTIONS	A	
7332009	1.00	COVER TOP	G	
7332030	1.00	PLATE BASE PAINTED	D	
7332034	1.00	SHIPPING BOX END CAPS SHELF	D	
7770102	1.00	LABEL "FCC COMPLIANCE"	A	Installed by QC
7770107	1.00	TAG S/N (AW)	D	Installed by QC
7771009	1.00	LABEL CE MARK	A	Installed by QC
7771010	1.00	LABEL ETL UL CSA 1010.1 LISTED	A	Installed by QC
9001018	1.00	LABEL IN-VITRO DIAG USE	A	Installed by QC
91046	0.00	BUBBLE PACK MED 24"W	A	A/R

BILL OF MATERIALS REPORT

PART: 7330400
DESC: MAIN PCB ASBY
29-Jun-1995
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COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
04018	1.00	LCD 2X24 SUPERTWIST DISPLAY	B	[DSP1]
12089	4.00	SCR PAN 2-56X1/4 SS PHIL	A	
16001	4.00	LKWSHR #2 HELICAL SPR	A	
21010	3.00	DIODE IN5821 SCHOTTKY 30V 1/4W	A	CR1 CR3 CR4
23013	2.00	OP AMP LT1012CN8 SINGLE	B	U18 19
23021	1.00	VOLT REG +ADJ 1.5A 317	B	U5
23026	1.00	VOLT REG +5V 78L05A	A	U7
23029	1.00	VOLT REG -5V 79L05	A	U6
23072	1.00	VOLT REG LM2575T	C	U1
23092	1.00	VOLT REG ADJ LM2576 SWITCHER	A	U2
25027	2.00	IC 74HC595 SHIFT REG 8BIT 3ST	B	U13 14
25051	1.00	IC 74LS04 HEX INVERTER	C	U41
25084	2.00	IC 74HC541 TS OCTAL BFR NONINV	D	U23 43
25086	5.00	IC 74HC574 OCTAL D FLIP- FLOP	C	U20 21 26 44 45
25094	1.00	IC L7662CPA NEG CONVERTER	B	U4
25106	1.00	IC 74AC245 OCTAL TRANSCIEVER	E	U22
25107	2.00	IC 74AC32 QUAD 2-INPUT OR GATE	D	U16 42
25108	1.00	IC LT1017CN8 COMPARATOR	A	U60
25114	1.00	IC LT1080 RS232 DRU/RECEIVER	A	U8
25130	3.00	IC 74AC373 OCTAL LATCH	A	U31-33
25131	1.00	IC 74AC08 QUAD 2-INPUT AND	A	U15
25132	2.00	IC 74AC138 1 OF 8 DECODER	A	U47 48
25133	1.00	IC CS5102 A/D 16BIT	A	U9
25135	1.00	IC 80C186-20 UP PLCC	B	[U30]
25136	1.00	IC DS1233-10 ECONO RESET	A	U29
28004	1.00	VOLT REF 2.5	B	U27
28043	1.00	VOLT REF 1.2 LT1004 +/-4MV	B	CR5
28058	1.00	TRANS ARRAY 2003 DARL 5V	A	U11
28064	3.00	IC STEPPER MOTOR DRIVER	B	U25 39 54
28073	1.00	IC DS1215 TIME CHIP	A	U40

		PHANTOM		
28115	1.00	OP AMP TL072	A	U12
28116	1.00	VOLT REF 5V LT1021	A	U10
29002	1.00	IC 7523 8-BIT D-A CONVERT	A	U17
29084	3.00	IC D/A DUAL 7 BIT	C	U24 38 53
29106	2.00	IC 128KX8 CMOS STATIC RAM	D	U36 51
29130	2.00	IC AM29F040-120 512K FLSH	A	U34 49
		MEM		
29131	1.00	TRANSZORB 33V 1.5KE33A	A	CR2
29132	2.00	IC FLASH MEM 128KX8	A	U50 35
31300	6.00	RES 30.0 OHM 5% 1/4W	A	R51 52 53 54 55 56
32028	1.00	RES 49.90K OHM 1% 1/4W	A	R24
32039	1.00	RES 1.00M OHM 1% 1/4W	A	R14
32042	1.00	RES 10.00K OHM 1% 1/4W	A	R65
32044	2.00	RES 20.00K OHM 1% 1/4W	A	R19 22
32047	8.00	RES 1.000K OHM 1% 1/4W	A	R1 17 33 34 39 40 45
32052	2.00	RES 2.00M OHM 1% 1/4W	A	R29 30
32085	4.00	RES 15.00K OHM 1% 1/4W	A	R28 41 42 50
32099	2.00	RES 10.00 OHM 1% 1/4W	A	R10 11
32112	3.00	RES 2.00K OHM 1% 1/4W	A	R21 R23 R63
32113	1.00	RES 4.02K OHM 1% 1/4W	A	R16
32126	2.00	RES 1.870K OHM 1% 1/4W	A	R4 9

BILL OF MATERIALS REPORT

PART: 7330400
 DESC: MAIN PCB ASBY
 29-Jun-1995
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COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
32140	1.00	RES 6.19K OHM 1% 1/4W	A	R18
32158	1.00	RES 2.49M OHM 1% 1/4W	A	R62
32195	4.00	RES 22.10 OHM 1% 1/4W	A	R12 13 25 49
32228	1.00	RES 3.83K OHM 1% 1/4W	A	R3
32232	8.00	RES 200.00OHM 1% 1/4W	A	R6-8 15 20 26 27 66
32296	1.00	RES 3.32K 1% 1/4W	A	R2
33047	6.00	RES 1.00 OHM 1% 1W	A	R31 36-38 43 48
35009	1.00	TRIMPOT 20K 25T	A	RT1
37002	4.00	RESNET 10K OHM 5R 6P SIP	A	RN5-7 13
37007	3.00	RESNET 180 OHM 5R 10P SIP	A	RN2-4
37046	6.00	RESNET 10K SIP 10PIN 9RES 5%	A	RN1 8-12
37094	1.00	RES 10.00K OHM .1% 1/4W 5PPM	A	R61
37101	1.00	RESONATOR 1.26MHZ CERAMIC	A	Y2
38062	1.00	RES 75 OHM 5% 1 WATT	B	R64
38063	1.00	RES 29.4K .1% 1/4W	A	R60
42150	1.00	HEDR 12-P .100 RTANG BRKS	A	J9
42171	1.00	CONN 5PIN .1 RT ANGL	A	J3
42225	1.00	HEDR 3-P .156 LOK	A	J1
42269	1.00	HEDR 26P DUAL ROW 0.100	A	J5
42310	1.00	HEDR 14PIN FOR LCD MOUNTING	A	[J10]
42311	1.00	HEDR 14PIN .1X.1 FOR LCD	A	[]
42332	3.00	HEDR 4-P .100 RTANG POLARIZED	B	J2 7 8
42552	1.00	CONN 12P .049 RT STR RLF	A	J6
46082	1.00	FUSE RESETABLE 5A PCB MNT	A	F1
47049	1.00	BATTERY 3V LITHIUM COIN	A	[BT1]
47050	1.00	BATTERY HOLDER 3V LITH COIN	A	[BT1 HOLDER]
49014	9.00	TERM PCB	B	TP1-9
49149	2.00	SOCKET IC 28-PIN DIP	B	SOCKET FOR U37 52
49478	1.00	SOCKET 84-PIN PLCC	A	SOCKET FOR U30
49694	1.00	HEDR 10P .1	A	J4
49741	1.00	CRYSTAL 32.768KHZ	A	Y1
49743	1.00	CRYSTAL CLOCK OSC 32 MHZ	A	U28
54005	1.00	SW DIP 4-SW SIDE-ACT	A	SW1
62027	1.00	FILTER EMI SUPPR .5-1GHZ	A	U3
63018	2.00	INDUCTOR 220UH	A	L1 2

65020	1.00	BUZZER 3-16V PIEZO	C	[BP1]
7330200	1.00	FIRMWARE ASBY	C	"HIGH" IN U52 "LOW" IN U37
7330400-AS	0.00	MAIN PCB ASBY	E	DOCUMENT ONLY
7330400-SC	0.00	MAIN PCB ASBY SCHEMATIC	D	DOCUMENT ONLY
7330505	1.00	PCB W/SWAGES ASBY	A	
81004	10.00	CAP 100 UF 63V ELEC	A	C1 3 4 7 18 19 61 64
81006	2.00	CAP 470 uF 10V ELEC	F	C2 5
81027	2.00	CAP 10000UF ELECTROLYTIC	A	C117 C118
82003	6.00	CAP 10 uF 25V TANT	C	C32 34 38 68 71 116
82005	18.00	CAP 1uF 35V TANT	D	C8 10-17 20 25 26 33 101 103 105
83021	1.00	CAP 1000 pF 200V DISC	A	C28
83023	3.00	CAP 100pF 200V DISC	A	C45 50 112
83049	4.00	CAP 33PF 100V CER	A	C113 C114 22 23

BILL OF MATERIALS REPORT

PART: 7330400
 DESC: MAIN PCB ASBY
 29-Jun-1995
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COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
84003	1.00	CAP .068 uF 100V FILM	A	C43
84039	8.00	CAP 820 PF 200V 10% X7R	A	C6 37 58 60 82 84 10
84054	3.00	CAP .0033UF FILM	A	C57 85 86
85002	1.00	CAP .01 uF 100V 1%	D	C115
85024	60.00	CAP .1UF 50V CER	A	C9 21 24 27 29-31 35 44 46-49 51-56 59 62 69 70 72-81 83 87-92 102 104 106-108 119

Drawings/Bill of Materials for Main Board with Daughter Modules

Assembly Drawings

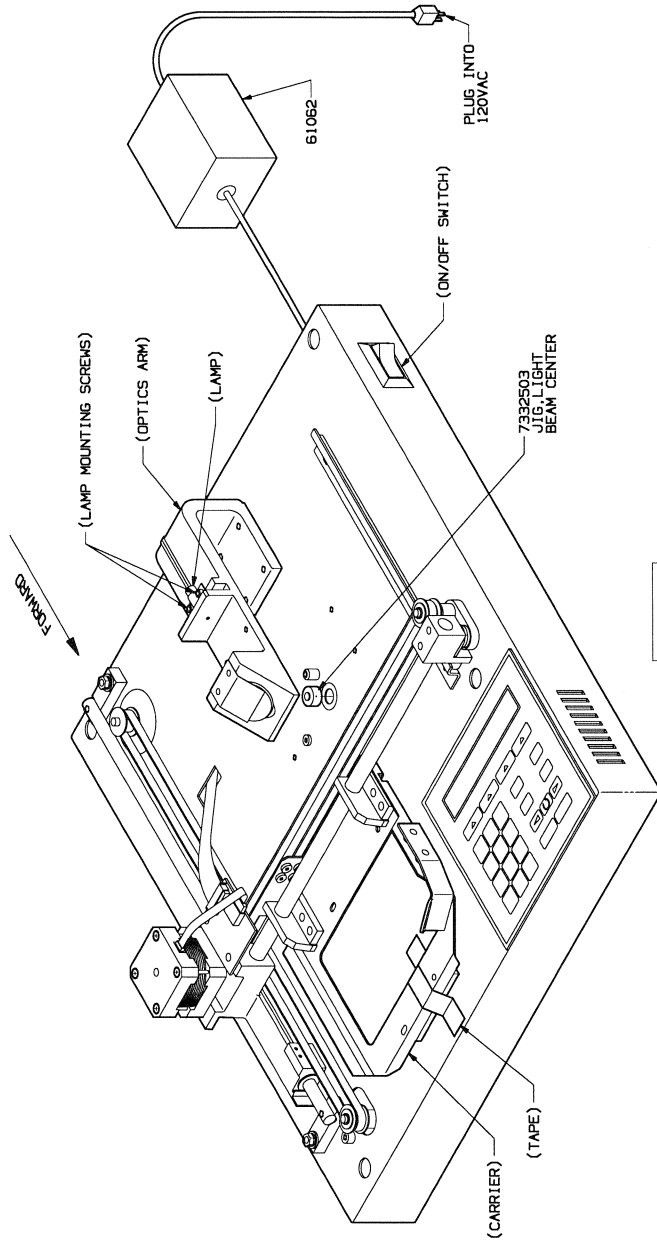
The following drawings are the assembly documentation used to assemble the *ELx800* and its variations. These drawings are subject to change.

7330005-AS FINAL ASBY
7330410-AS MAIN PCB (Less front end)
7330415-AS MAIN PCB (New)
7330401-AS
7330404-AS
7330414-AS
7330413-AS
7330523-AS
7330524-AS
7330522-As
7330501-AS CABLE LAMP ASBY
7330502-AS CABLE MOTOR Y AXIS ASBY
7330503-AS CABLE POWER INPUT ASBY
7330504-AS CABLE LAMP EXTENSION ASBY
7330506-AS CABLE OPTO 14L ASBY
7330507-AS CABLE X AXIS MOTOR
7330508-AS MECH PRE ASSEMBLED ASBY
7330509-AS CABLE LAMP UV ASSEMBLY
8050509-AS CABLE FILTER WHEEL MOTOR ASBY

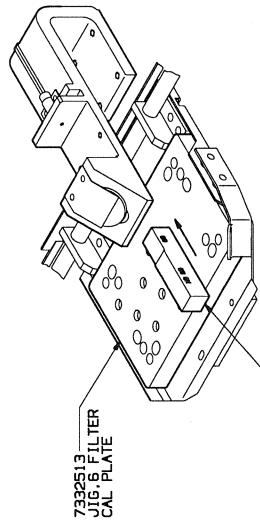
A B C D E F G H I J

OPTICS ALIGNMENT

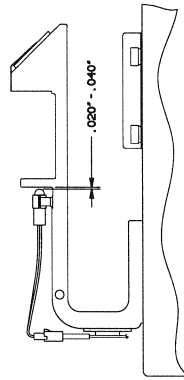
- STEP 8A: REMOVE THE CARRIER TAPE.
- STEP 8B: WITH THE POWER SUPPLY (61062) ON AND THE LAMP ON, INSERT THE CARRIER UNDER THE OPTICS ARM SO THE LIGHT BEAM STRIKES IT.
- STEP 8C: LOOSEN THE LAMP MOUNTING SCREWS (2X). ADJUST THE OPTIC ARM FORWARD UNTIL IT HITS THE OPTIC ARM FOR UV AND NB UNITS. THE LAMP BEAM SHOULD BE AT THE CENTER OF THE OPTIC ARM. TIGHTEN THE LAMP MOUNTING SCREWS (2X). VERIFY THE IMAGE IS STILL CIRCULAR.
- STEP 8D: INSERT JIG LIGHT BEAM CENTER AS SHOWN IN STEP 8. ADJUST THE OPTICS ARM SO THAT THE BEAM IS IN THE CENTER OF THE JIG. TORQUE THE OPTICS ARM MOUNTING SCREWS TO 22in/lbs (4X). VERIFY NOTHING HAS CHANGED.
- STEP 8E: INSERT 8 FILTER CAL PLATE ASBY JIG. 7332513. INTO THE CARRIER AS SHOWN IN DETAIL 4. SLIDE THE 60/NO GO OPTIC ARM JIG (7332514 FOR NB, 7332515 FOR STD AND UV) BETWEEN THE OPTIC ARM AND THE CAL PLATE JIG AS SHOWN IN DETAIL 4.
- STEP 8F: IF THE '60" PORTION OF THE JIG PASSES UNDER THE OPTIC ARM, AND THE 'NO GO' PORTION DOES NOT, THEN THE OPTIC ARM HEIGHT IS CORRECT. NO FURTHER ADJUSTMENT IS NECESSARY. GO TO STEP 8I. IF THE '60" PORTION OF THE JIG DOES NOT PASS UNDER THE OPTIC ARM, GO TO STEP 8G. IF THE 'NO GO' PORTION OF THE JIG PASSES UNDER THE OPTIC ARM, GO TO STEP 8H.
- STEP 8G: IF THE '60" PORTION OF THE JIG DOES NOT PASS UNDER THE OPTIC ARM, THEN THE OPTIC ARM IS TOO LOW. REMOVE THE OPTIC ARM MOUNTING SCREWS. ADD ONE SHIM. 7332080. UNDER THE OPTIC ARM AND REASSEMBLE. REPEAT STEPS 8A THRU 8F. THIS STEP MAY BE REPEATED ONCE MORE. IF THE '60" PORTION OF THE JIG STILL DOES NOT PASS UNDER THE OPTIC ARM AFTER ADDING TWO SHIMS, THEN THE UNIT HAS FAILED.
- STEP 8H: IF THE 'NO GO' PORTION OF THE JIG PASSES UNDER THE OPTIC ARM, THEN THE OPTIC ARM IS TOO HIGH. REMOVE THE OPTIC ARM MOUNTING SCREWS. REMOVE THE SHIM 7332080. UNDER THE OPTIC ARM AND REASSEMBLE. REPEAT STEPS 8A THRU 8F. THIS STEP MAY BE REPEATED ONCE MORE. IF THE 'NO GO' PORTION OF THE JIG STILL PASSES UNDER THE OPTIC ARM, THEN THE UNIT HAS FAILED.
- STEP 8I: TURN OFF UNIT. DISCONNECT POWER SUPPLY. REMOVE JIGS FROM CARRIER. RETAPE CARRIER AS SHOWN IN STEP 8. COMPLETE ASSEMBLY/ALIGNMENT SECTION ON DATA SHEET.



STEP 8



DETAIL 4



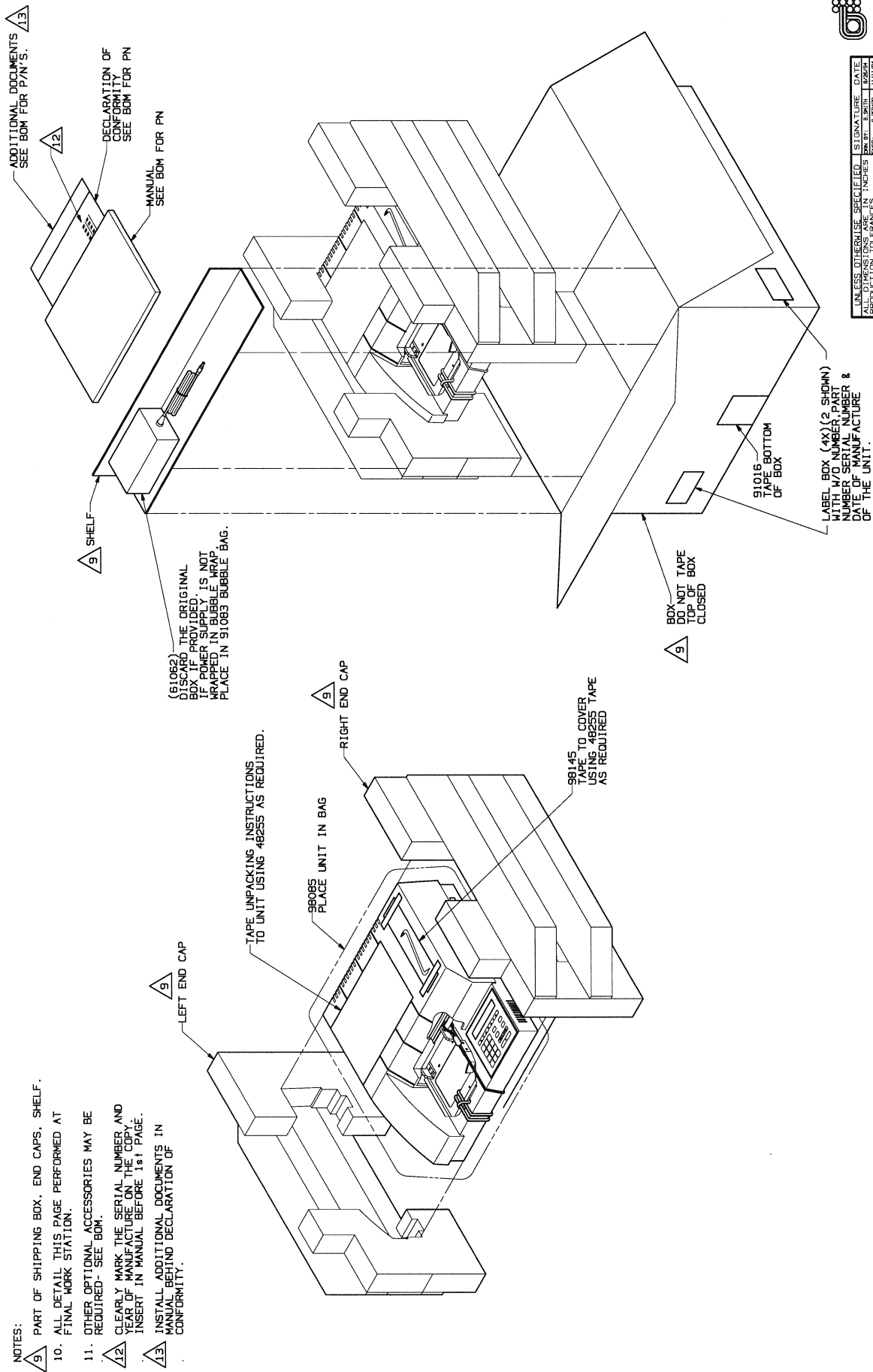
DETAIL 5

FOR UV AND NB UNITS ONLY.
SPACE BULB BACK AS SHOWN.



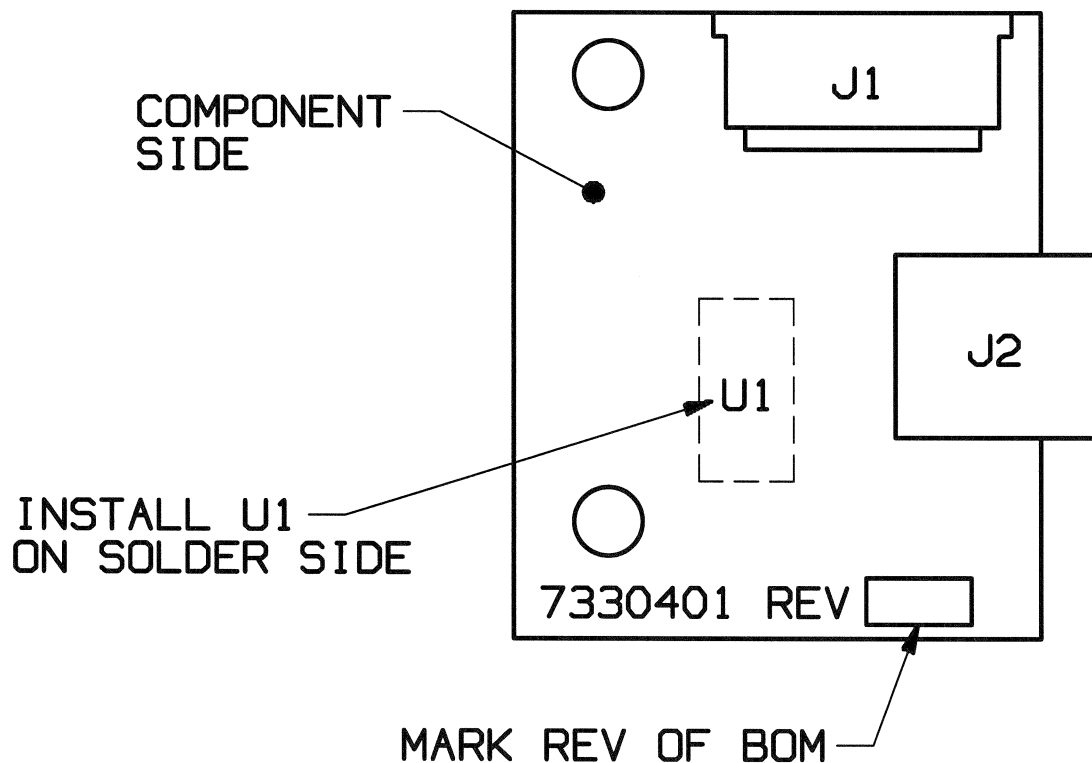
UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	BY: J. B. BIRD	10/1/83
PRODUCTION TOLERANCES	SIZE: B. BIRD	10/1/83
.XX1.010	ANAL.	
WAVELENGTH	SURFACE FINISH: 83	
FINISH:		
DO NOT SCALE	REWORK	AL BIRDS
DO NOT SCALE	REWORK	AL BIRDS
DO NOT SCALE	REWORK	AL BIRDS

TITLE:	FINAL ASBY
SIZE: DRAWING NO.	D 7330005-AS
SCALE:	3/4
SHEET:	3 OF 6



UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
DIMENSIONS IN INCHES DIMENSIONS IN MILLIMETERS .125" 3.175" .015" .381" ANGULAR 10°-12° SURFACE FINISH B3 MATERIAL: 304L D05	THIS DOCUMENT IS THE PROPERTY OF THE UNIVERSITY OF CALIFORNIA, AN ALIEN FIRM OR COMPANY, AND IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF THE UNIVERSITY OF CALIFORNIA.	8/26/98 11/11/98
MATERIAL:	FINISH:	THIRD ANGLE PROJECTION
DO NOT SCALE	SHOWN ALWAYS	SHEET 1 OF 1

REV	DESCRIPTION	ECO	DATE	BY
A	RELEASE TO PRODUCTION	25462	9/13/94	BPS



UNLESS OTHERWISE SPECIFIED		SIGNATURES		DATE		TITLE					
ALL DIMENSIONS ARE IN INCHES PRODUCTION TOLERANCES .X±.015 ANGULAR TOL. ±2° .XX±.010 .XXX±.005 SURFACE FINISH 63✓		DRN BY: B.SMITH		9/8/94		MOVING INTCON PCB ASBY					
		ENGR									
MATERIAL:		THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.				SIZE		DRAWING NO.		REV	
FINISH:						A		7330401-AS		A	
DO NOT SCALE						BREAK SHARP EDGES		SCALE: 2/1		SHEET 1 OF 1	

ASSEMBLY INSTRUCTIONS FOR BTI P/N'S 7330413 & 7330414

1. INSTALL ALL COMPONENTS EXCEPT THE PHOTODIODE.
2. FILL THE G HOLE (CR1) WITH SOLDER IF THERE IS ONE.
3. CLEAN WITH ISOPROPYL ALCOHOL OR ULTRASONIC CLEANER TO ACHIEVE A CLEANLINESS LEVEL OF 1 Ng OF NOCl/cm²
4. BAKE FOR 2HR 180°F.
5. INSTALL DIODE PER PRINT. USE NO CLEAN SOLDER.
6. LABEL ASSEMBLY WITH BOM #.



SPACE DIODE .010 TO .015 ABOVE PCB SURFACE.

ADDITIONAL INSTRUCTIONS FOR BTI P/N 7330414

THIS ASSEMBLY SHALL BE COATED BY ONE OF THE FOLLOWING ALTERNATE METHODS

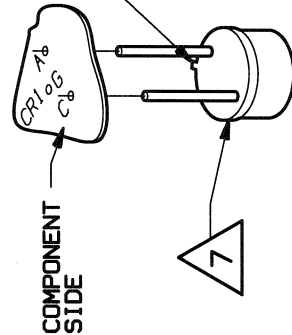
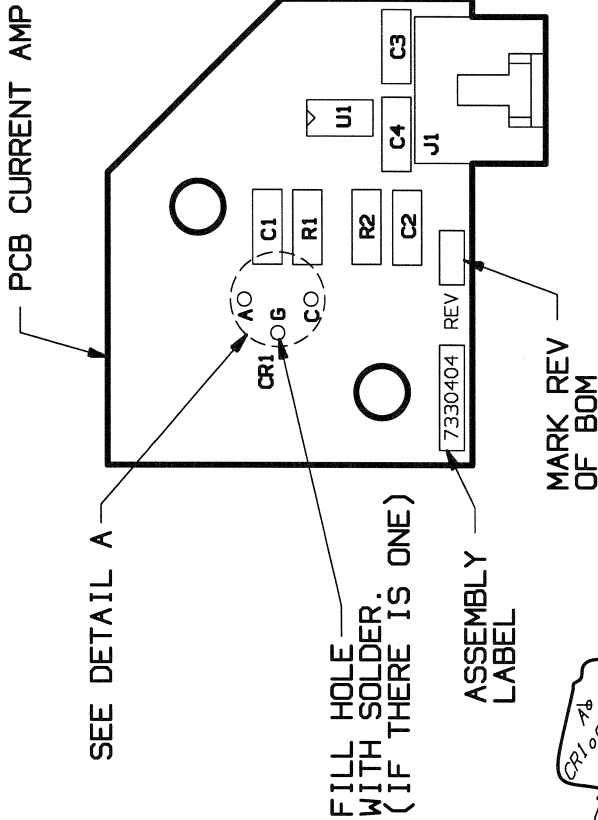
PROCESS A: 1. PROCESS PER BIO-TEK MANUFACTURING PROCESS P481.

PROCESS B: 1. MASK THE DIODE GLASS AND CONNECTOR.

2. COAT USING HYSOL #PC18M IN ACCORDANCE WITH MIL-I-46058C TYPE UR.

3. REMOVE THE MASKING MATERIAL AND CLEAN THE DIODE GLASS WITH ISOPROPYL ALCOHOL.

4. INSPECT THE ASSEMBLY TO CONFIRM THAT THE BOARD IS FULLY COATED EXCEPT FOR THE DIODE GLASS AND INSIDE OF THE CONNECTOR.



DETAIL A

UNLESS OTHERWISE SPECIFIED		SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES		DRN BY: B. SMITH	8/22/95
PRODUCTION TOLERANCES		ENGR: B. BEDARD	9/13/95
.XX±.015			
.XXX±.010			
.XXX±.005			
MATERIAL:			
FINISH:			
DO NOT SCALE		REMOVE ALL BURRS	BREAK SHARP EDGES
THIRD ANGLE PROJECTION			

1	REPLACE COATING PROCESS	28312	11/15/96	BPS
H	CHG COATING TO HUMI SEAL 1873	27790	8/6/96	PEB
G	7330414 BETS COATING, 7330413 DOESN'T	27767	8/2/96	BPS
F	CHG CONFORMAL COATING	27745	7/30/96	PEB
E	CHG ASSEMBLY INSTRUCTIONS	27662	7/2/96	PEB
D	REDRAW	27284	3/6/96	BPS
C	ADD LENGTH : ADD DETAIL B	27179	2/2/96	BPS
B	CHG: WIRE LENGTH: ADD: NOTE	26863	11/14/95	BPS
A	RELEASE TO PRODUCTION	26598	9/12/95	BPS
REV	DESCRIPTION	ECO	DATE	BY



TITLE:		PCB CURRENT AMP ASBY
SIZE	DRAWING NO.	REV
B	7330404-AS	I
SCALE:	2/1	SHEET 1 OF 1

A B C D E F G H I J

SEE DETAIL B

48225 MARK AS SHOWN

MARK REV OF BOM

ADD JUMPER WIRE SOLDER SIDE OF BOARD. SEE DETAIL C.

REMOVE THIS PIECE AFTER SOLDERING.

FLEX CABLE OPENING THIS SIDE

CONN PIN	PCB LOCATION
1	U19, PIN 7
2	R58
3	U19, PIN 6
4	R30
5	U19, PIN 4

DETAIL E

SEE DETAIL A

SET ALL SWITCHES DOWN

PCB W/SWAGES ASBY

FIRMWARE CHIP HIGH SOCKET

FIRMWARE CHIP LOW SOCKET

TRIM J9 LEADS BEFORE INSTALLING DISPLAY

47049 POSITIVE SIDE DOWN

SOLDER SIDE

DETAIL A

DETAIL B

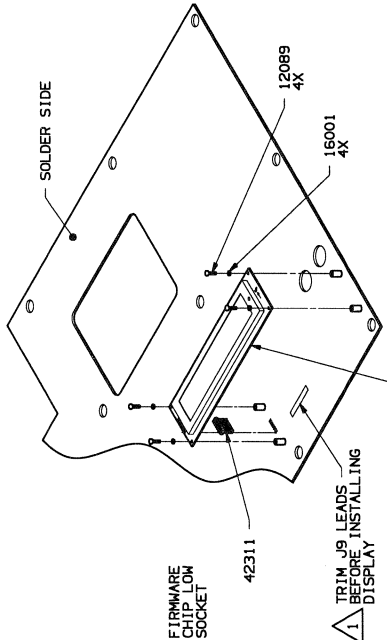
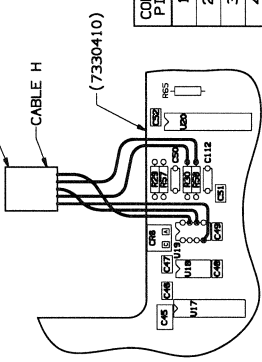
FORM LEADS TO ENSURE PROPER STRESS RELIEF. THEN WRAP AND SOLDER AS SHOWN

DETAIL C

DETAIL D

NOTES:

1. SOLDER 42311 TO DISPLAY BEFORE MOUNTING DISPLAY TO BOARD (LOCATE IN HOLES 1-14). HOLES 15 & 16 NOT USED.
2. COMPONENTS NOT INSTALLED. SEE DETAIL E FOR INSTALLATION OF CABLE H.



UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DESIGNED BY: B. SMITH	11/15/92
ALL DIMENSIONS ARE IN INCHES	DRAWN BY: B. SMITH	11/15/92
ALL DIMENSIONS ARE IN INCHES	CHECKED BY: B. SMITH	11/15/92
ALL DIMENSIONS ARE IN INCHES	APPROVED BY: B. SMITH	11/15/92

MAIN PCB ASBY (LESS FRONT END)

REV	DATE	DESCRIPTION	BY	CHKD	APPD
1	11/15/92	INITIAL RELEASE	B. SMITH		
2	11/15/92	REVISED FOR BOM	B. SMITH		
3	11/15/92	REVISED FOR BOM	B. SMITH		
4	11/15/92	REVISED FOR BOM	B. SMITH		
5	11/15/92	REVISED FOR BOM	B. SMITH		
6	11/15/92	REVISED FOR BOM	B. SMITH		
7	11/15/92	REVISED FOR BOM	B. SMITH		
8	11/15/92	REVISED FOR BOM	B. SMITH		
9	11/15/92	REVISED FOR BOM	B. SMITH		
10	11/15/92	REVISED FOR BOM	B. SMITH		

SCALE: NONE

SHEET 1 OF 1

NOTES:

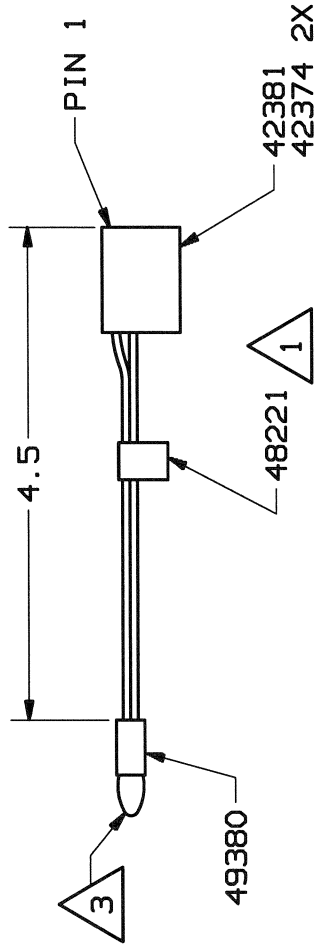
1 MARK 7330501-C ON LABEL.

2. ALL UNTOLERANCED DIMENSIONS ARE $\pm .50"$.

3 DO NOT TOUCH LAMP WITH FINGERS.

WIRE LIST

CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
49380	1	---	---	---	3.75	42381	1
49380	2	---	---	---	3.75	42381	2



TITLE:

CABLE;
LAMP ASBY

SIZE	DRAWING NO.	REV
B	7330501-AS	C
SCALE:	1/1	SHEET 1 OF 1

UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES PRODUCTION TOLERANCES .X \pm .015 ANGULAR TOL. \pm 2° .XXX \pm .005 SURFACE FINISH 63/	DRN BY: B. SMITH ENGR: B. BEDARD	8/18/94 9/15/94
MATERIAL:	THIS DOCUMENT CONTAINS CONFIDENTIAL INFORMATION. IT IS THE PROPERTY OF BIO-TEK INSTRUMENTS, INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS, INC.	
FINISH:	THIRD ANGLE PROJECTION	
DO NOT SCALE	REMOVE ALL BURRS	BREAK SHARP EDGES

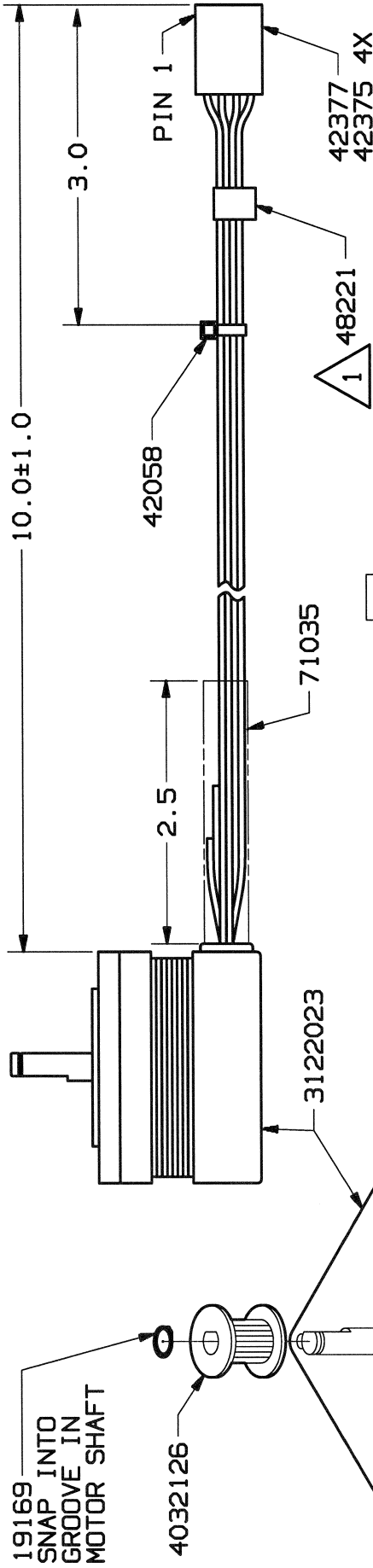
REV	DESCRIPTION	ECD	DATE	BY
C	CHG LENGTH FROM 4.0 TO 4.5	27904	9/5/96	PEB
B	CHG 42379 TO 42374; ADD NOTE 3	25679	11/15/94	BPS
A	RELEASE TO PRODUCTION	25466	9/13/94	BPS

NOTES:

- 1 MARK 7330502-A ON LABEL.
2. ALL UNTOLERANCED DIMENSIONS ARE $\pm .50"$.

WIRE LIST

CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
3122023	—	—	GRN/WHT	22	9.5	42377	1
3122023	—	—	RED/WHT	22	9.5	42377	2
3122023	—	—	GRN	22	9.5	42377	3
3122023	—	—	RED	22	9.5	42377	4
3122023	—	—	WHT	22	1	—	—
3122023	—	—	BLK	22	1.5	—	—



UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DRN BY: B. SMITH	7/25/94
PRODUCTION TOLERANCES	ENGR: B. BEDARD	9/15/94
.X \pm .015	MGR:	
.XX \pm .010	THIS DOCUMENT CONTAINS CONFIDENTIAL INFORMATION OF BIO-TEK INSTRUMENTS, INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS, INC.	
.XXX \pm .005	THIRD ANGLE PROJECTION	
MATERIAL:	FINISH:	BREAK SHARP EDGES
DO NOT SCALE	REMOVE ALL BURRS	

TITLE:		CABLE, MOTOR Y AXIS	
SIZE	DRAWING NO.	REV	REV
B	7330502-AS	C	C
SCALE:	1/1	SHEET	1 OF 1

REV	DESCRIPTION	ECO	DATE	BY
C	CHANGE LENGTHS PER ECO	26082	3/14/95	BPS
B	SNAP 2 & 3 ON 42377 CONN	25679	11/15/94	BPS
A	RELEASE TO PRODUCTION	25466	9/13/94	BPS

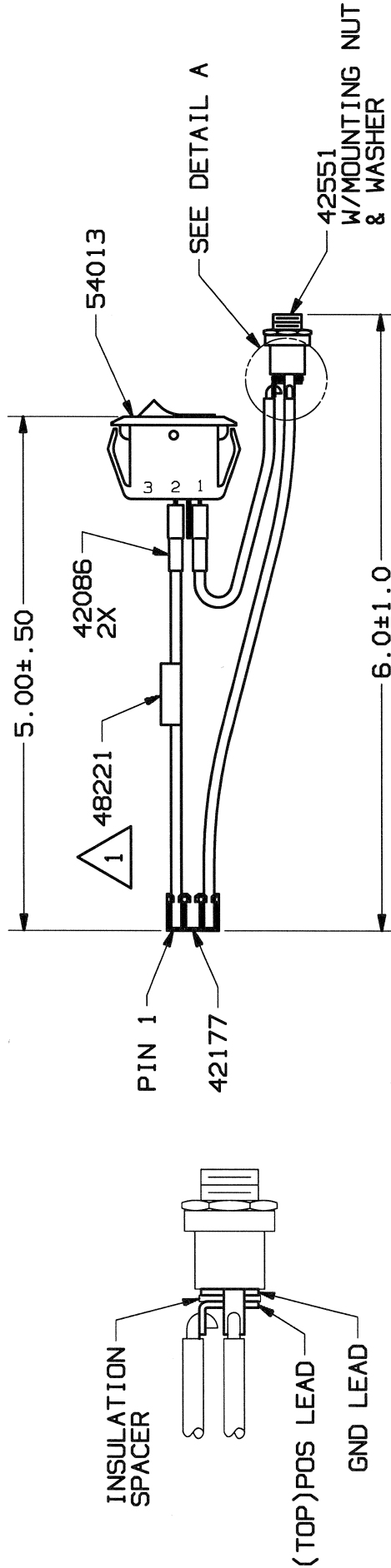
NOTES:

1 MARK 7330503-B ON LABEL.

2. ALL UNTOLERANCED DIMENSIONS ARE $\pm .50"$.

WIRE LIST

CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
54013	2	71093	RED	18	4.0	42177	1
54013	1	71093	RED	18	3.5	42551	POS
42551	GND	71093	RED	18	5.0	42177	3



DETAIL A

NOTE: SOME CONNECTORS MAY HAVE A THIRD LEAD ATTACHED TO 42551 BELOW THE FIRST TWO. THIS LEAD IS NOT USED.

B



UNLESS OTHERWISE SPECIFIED		SIGNATURE		DATE
ALL DIMENSIONS ARE IN INCHES		DRN BY: B. SMITH		7/26/94
PRODUCTION TOLERANCES		ENGR: B. BEDARD		9/15/94
.X \pm .015				
.XX \pm .010				
.XXX \pm .005				
SURFACE FINISH 63				
FINISH:				
MATERIAL:				
DO NOT SCALE		REMOVE ALL BURRS		BREAK SHARP EDGES
THIRD ANGLE PROJECTION				

TITLE:		CABLE, POWER INPUT ASBY	
SIZE	DRAWING NO.	REV	
B	7330503-AS	D	
SCALE:	1/1	SHEET	1 OF 1

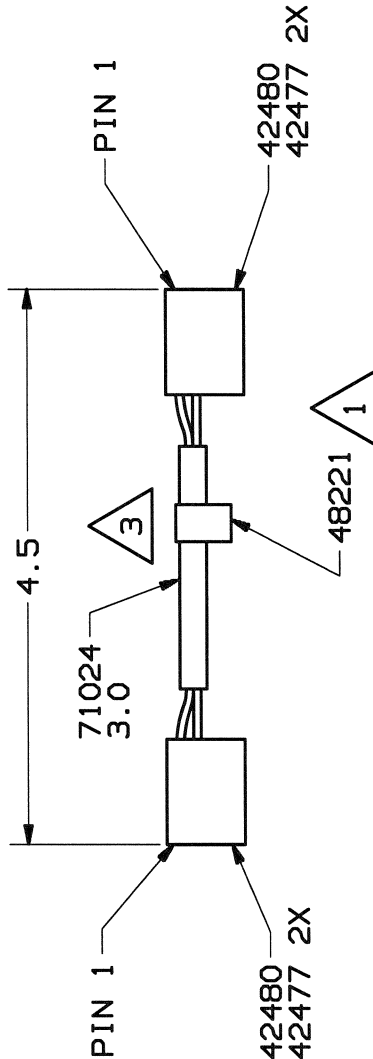
D	CHG WIRE: ADD NOTE	26931	11/28/95	BPS
C	CHG 2.5" TO 3.5"	26417	6/13/95	BPS
B	REVERSE 42177 CONN	25679	11/15/94	BPS
A	RELEASE TO PRODUCTION	25465	9/13/94	BPS
REV	DESCRIPTION	ECO	DATE	BY

NOTES:

- 1 MARK 7330504-D ON LABEL.
2. ALL UNTOLERANCED DIMENSIONS ARE $\pm .50"$.
- 3 DO NOT SHRINK THIS TUBING.

WIRE LIST

CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
42480	1	71101	BLK	22	4	42480	1
42480	2	71108	BLU	22	4	42480	2
42480	3	---	---	---	---	42480	3
42480	4	---	---	---	---	42480	4



D



UNLESS OTHERWISE SPECIFIED		SIGNATURE		DATE
ALL DIMENSIONS ARE IN INCHES		DRN BY: B. SMITH		8/18/94
PRODUCTION TOLERANCES		ENGR: B. BEDARD		9/15/94
.XX±.015				
ANGULAR TOL. ±2°				
.XXX±.005				
SURFACE FINISH 63/				
MATERIAL:		FINISH:		
DO NOT SCALE		REMOVE ALL BURRS		
BREAK SHARP EDGES		THIRD ANGLE PROJECTION		

REV	DESCRIPTION	ECD	DATE	BY
D	ADD 71024; CHG ONE WIRE TO BLUE	27813	8/13/96	PEB
C	CHG 42377 TO 42480	25761	12/6/94	BPS
B	CHG 42377 TO 42480	25693	11/15/94	BPS
A	RELEASE TO PRODUCTION	25465	9/13/94	BPS

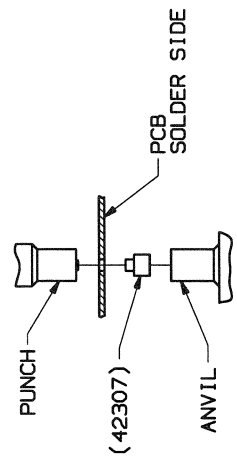
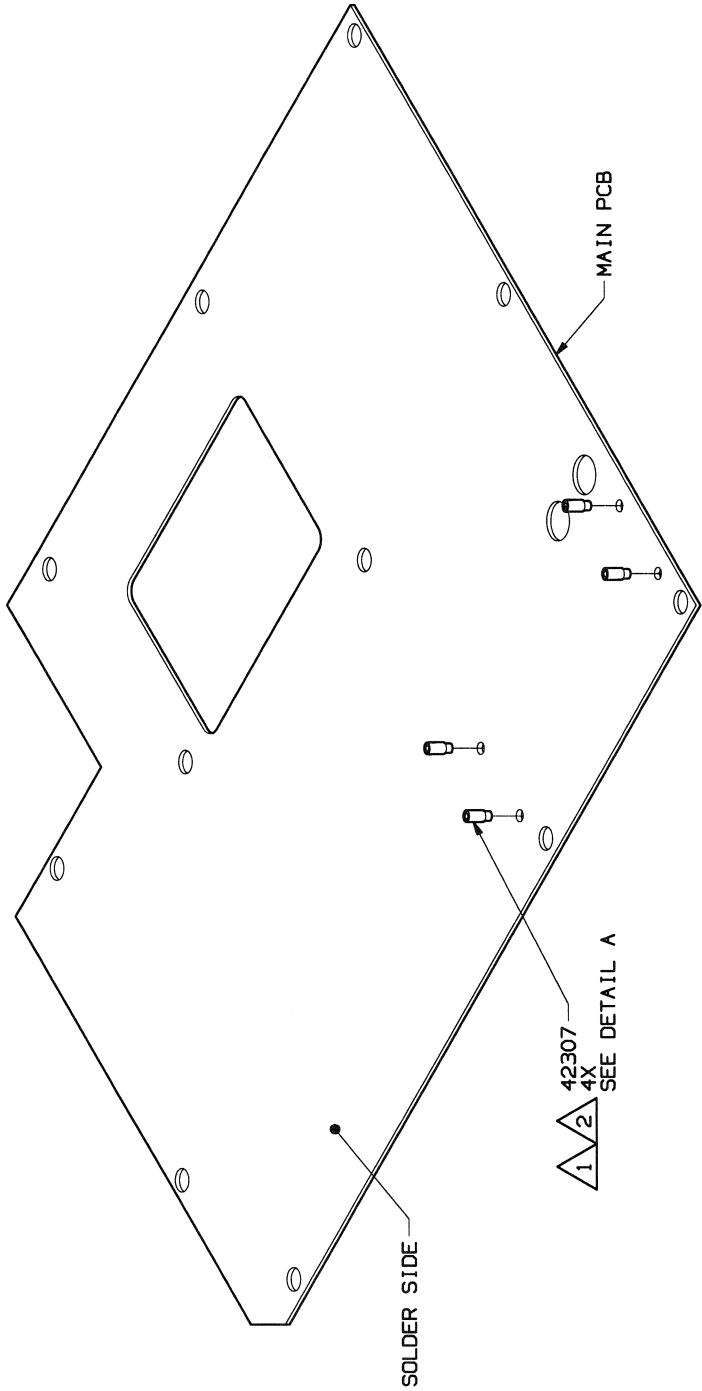
TITLE:

CABLE,
LAMP EXTENSION

SIZE	DRAWING NO.	REV
B	7330504-AS	D
SCALE:	1/1	SHEET 1 OF 1

A B C D E F G H I J

- NOTES:
- 1 USE SWAGING JIG, 3362020, TO SWAGE 42307 TO PCB.
 - 2 SWAGE MUST BE TIGHT TO PCB WITHOUT DAMAGING THE BOARD.



DETAIL A
PUNCH AND ANVIL
ARE PART OF
SWAGING JIG



TITLE: PCB
W/SWAGES ASBY
C 7330505-AS
SCALE: 1/1 SHEET 1 OF 1

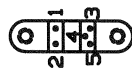
UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DRN BY: B. SMITH	9/7/94
PRODUCTION TOLERANCES	ENGR:	
.XX .010	MGR:	
.XX .005	THIS DOCUMENT CONTAINS CONFIDENTIAL INFORMATION AND IS THE PROPERTY OF BIO-TEK INSTRUMENTS, INC. AND NEITHER THIS DOCUMENT NOR THE INFORMATION CONTAINED HEREIN IS TO BE REPRODUCED, COPIED, OR Duplicated OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS, INC.	
MATERIAL: .XXX4.005	FINISH: SURFACE FINISH 63	THIRD ANGLE PROJECTION
DO NOT SCALE	REMOVE ALL BURRS	BREAK SHARP EDGES

NOTES:

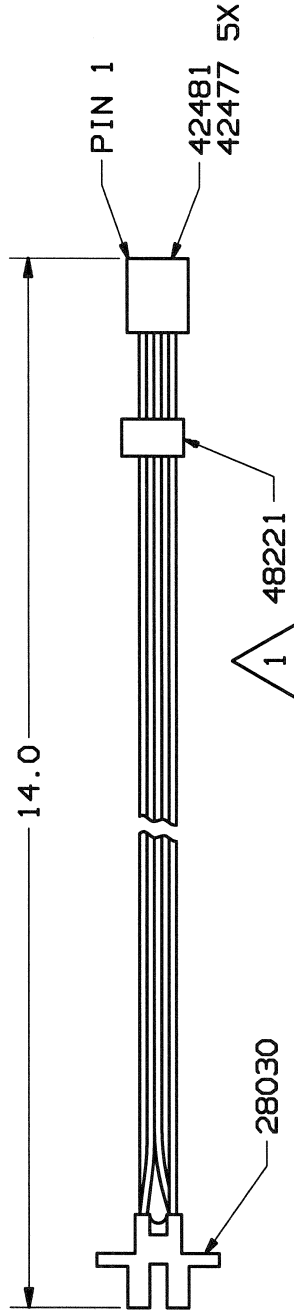
- 1 MARK 7330506-E ON LABEL.
2. ALL DIMENSIONS ARE $\pm .50"$ UNLESS OTHERWISE SPECIFIED.
3. TWIST WIRES APPROX. 1 TURN PER INCH PRIOR TO PLUGGING THE CONNECTOR.

WIRE LIST

CONN	OPTO LEAD #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
28030	1	—	—	26	13.5	42481	2
28030	2	—	—	26	13.5	42481	1
28030	3	—	—	26	13.5	42481	3
28030	4	—	—	26	13.5	42481	4
28030	5	—	—	26	13.5	42481	5



OPTO BACK VIEW



E



UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DRAWN BY: B. SMITH	8/18/94
PRODUCTION TOLERANCES	ENGR: B. BEDARD	9/15/94
.X \pm .015	MGR:	
ANGULAR TOL. #2		
.XX \pm .010		
.XXX \pm .005		
SURFACE FINISH 63		
FINISH:		
MATERIAL:		
DO NOT SCALE	REMOVE ALL BURRS	BREAK SHARP EDGES
ECO	DATE	BY
26841	10/25/95	BPS
25467	9/13/94	BPS
DESCRIPTION		

TITLE:	
CABLE OPTO, 14L ASBY	
SIZE	DRAWING NO.
B	7330506-AS
REV	REV
B	B
SCALE:	SHEET 1 OF 1
1/1	

NOTES:

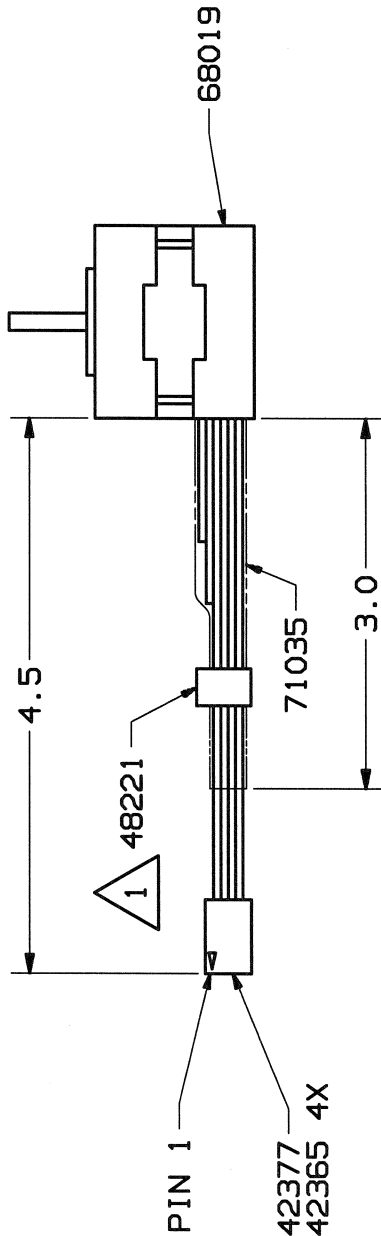


MARK 7330507-F ON LABEL.

2. ALL UNTOLERENCED DIMENSIONS ARE $\pm .50"$.

WIRE LIST

CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
MOTOR	—	—	YEL	26	4	42377	1
MOTOR	—	—	RED	26	4	42377	2
MOTOR	—	—	BLU	26	4	42377	3
MOTOR	—	—	WHT	26	4	42377	4
MOTOR	—	—	BRN	26	1.5	—	—
MOTOR	—	—	BRN	26	1	—	—



F



TITLE:

CABLE,
X-AXIS MOTOR

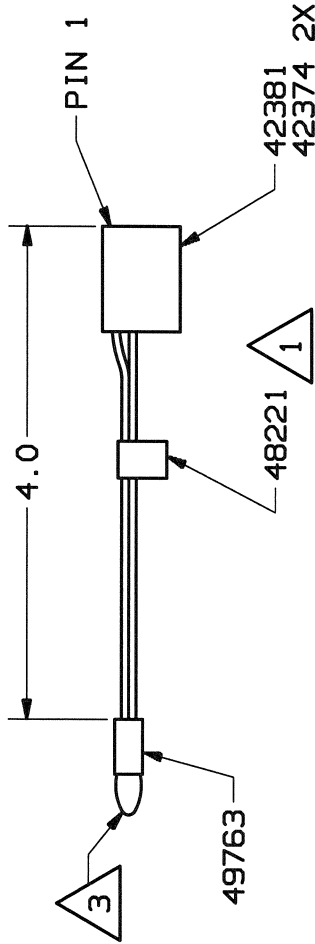
SIZE	DRAWING NO.	REV
B	7330507-AS	A
SCALE:	1/1	SHEET 1 OF 1

UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES PRODUCTION TOLERANCES .XX±.010 ANGULAR TOL. ±2° SURFACE FINISH 63/ .XXX±.005	DRAWN BY: B. SMITH ENGR: MGR:	10/12/94
MATERIAL: 1AW BOM	FINISH: NONE	REMOVE ALL BURRS
DO NOT SCALE	BREAK SHARP EDGES	

REV	DESCRIPTION	DATE	BY
A	RELEASE TO PRODUCTION	25575	10/18/94
		ECO	BPS

WIRE LIST						
CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	PIN #
49763	1	---	---	---	3.75	42381
49763	2	---	---	---	3.75	42381

- NOTES:
- 1 MARK 7330509-G ON LABEL.
2. ALL UNTOLERANCED DIMENSIONS ARE $\pm .50"$.
- 3 DO NOT TOUCH LAMP WITH FINGERS.



G



UNLESS OTHERWISE SPECIFIED		SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES		DRN BY: B. SMITH	8/18/94
PRODUCTION TOLERANCES		ENGR:	
.X \pm .015 ANGULAR TOL. $\pm 2^\circ$		MGR:	
.XX \pm .010 SURFACE FINISH 63		THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS, INC. IT IS NOT TO BE DISCLOSED TO OTHERS OR REPRODUCED IN ANY MANNER WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS, INC.	
MATERIAL:		THIRD ANGLE PROJECTION	
FINISH:		BREAK SHARP EDGES	
DO NOT SCALE		REMOVE ALL BURRS	

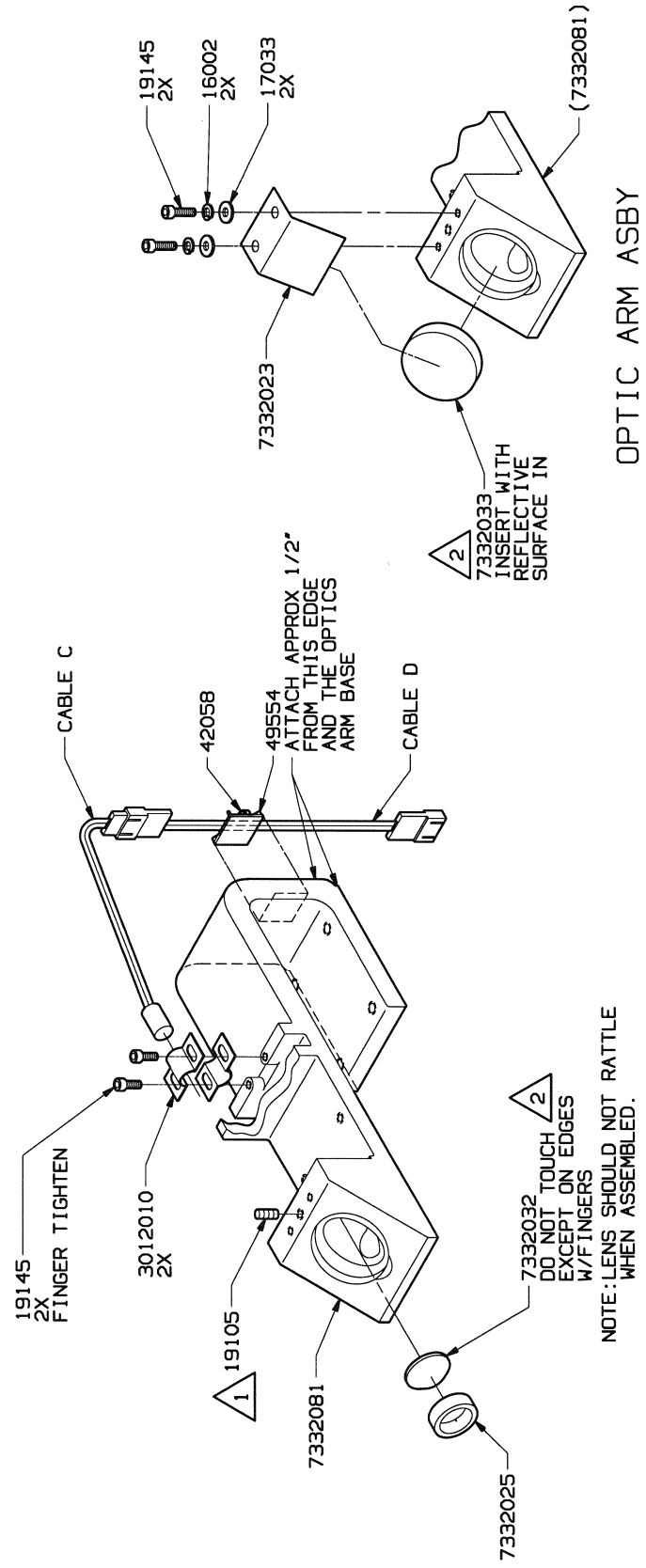
TITLE:		CABLE, LAMP UV ASBY	
SIZE	DRAWING NO.	REV	
B	7330509-AS	A	
SCALE: 1/1		SHEET 1 OF 1	

REV	DESCRIPTION	ECO	DATE	BY
A	RELEASE TO PRODUCTION	26246	4/25/95	BPS

A B C D E F G H I J

NOTES:

- 1 APPLY LOCTITE #242(66006) TO THREADS.
- 2 CLEAN WITH LENS PAPER, IF NEEDED. MUST BE FREE OF DUST OR FINGERPRINTS.



OPTIC ARM ASBY

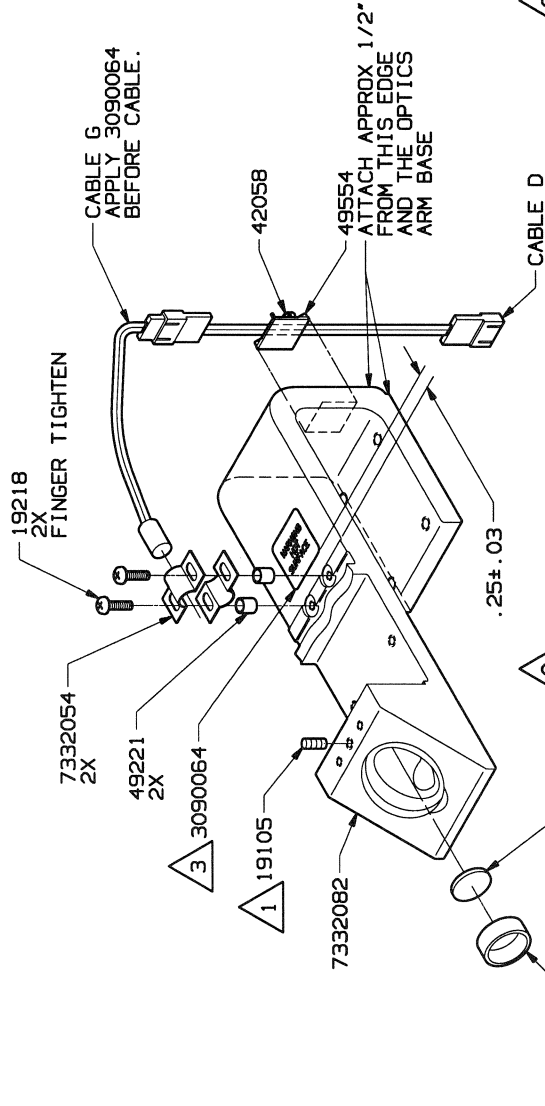


UNLESS OTHERWISE SPECIFIED		SIGNATURE	DATE	
ALL DIMENSIONS ARE IN INCHES		DRN BY: B. SMITH	1-5-96	
PRODUCTION TOLERANCES		ENGR: B. BEDARD	1/15/96	
XX-010 ANGULAR TOL. ±2°				
XX-010 SURFACE FINISH 63/				
MATERIAL: .XXX-005				
FINISH:				
DO NOT SCALE		REMOVE ALL BURRS	BREAK SHARP EDGES	
THIRD ANGLE PROJECTION				
THIS DOCUMENT CONTAINS CONFIDENTIAL INFORMATION AND IS THE PROPERTY OF BIO-TEK INSTRUMENTS, INC. AND NEITHER IT NOR THE INFORMATION CONTAINED HEREIN IS TO BE DISCLOSED OR REPRODUCED IN ANY MANNER OR BY ANY MEANS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS, INC.				
REV	DESCRIPTION	ECO	DATE	BY
B	CHG VIEW & MTG LOCATION OF 49554	28351	11/20/96	BPS
A	RELEASE TO PRODUCTION	27092	1/12/96	BPS

A B C D E F G H I J

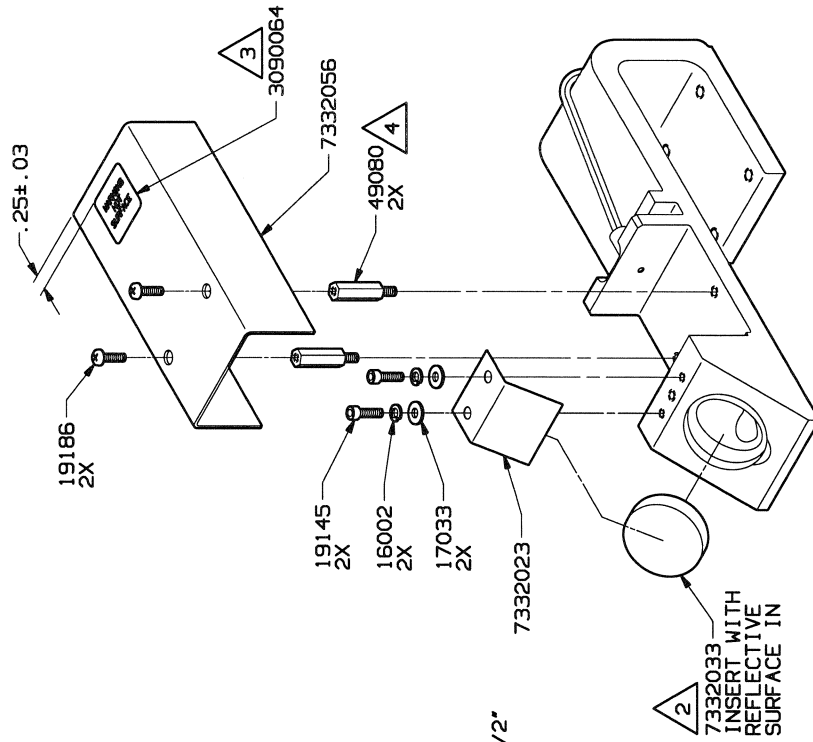
NOTES:

- 1 APPLY LOCTITE #242(66006) TO THREADS.
- 2 CLEAN WITH LENS PAPER, IF NEEDED. MUST BE FREE OF DUST OR FINGERPRINTS.
- 3 WIPE SURFACE WITH ALCOHOL BEFORE APPLYING.
- 4 APPLY LOCTITE #405(66033) TO THREADS.



STEP 1

NOTE: LENS SHOULD NOT RATTLE WHEN ASSEMBLED.



STEP 2



UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DRN BY: B. SMITH	1-6-96
PRODUCTION TOLERANCES	ENR BY: B. BEDARD	1/15/96
.XX+.005		
.XX+.010		
.XXX+.005		
MATERIAL:		
FINISH:		
SURFACE FINISH 63		
DO NOT SCALE	REMOVE ALL BURRS	BREAK SHARP EDGES
THIRD ANGLE PROJECTION		

TITLE:

OPTIC ARM
UV ASBY

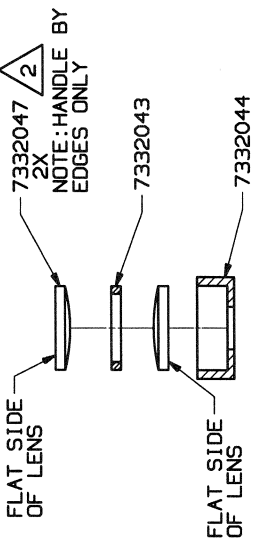
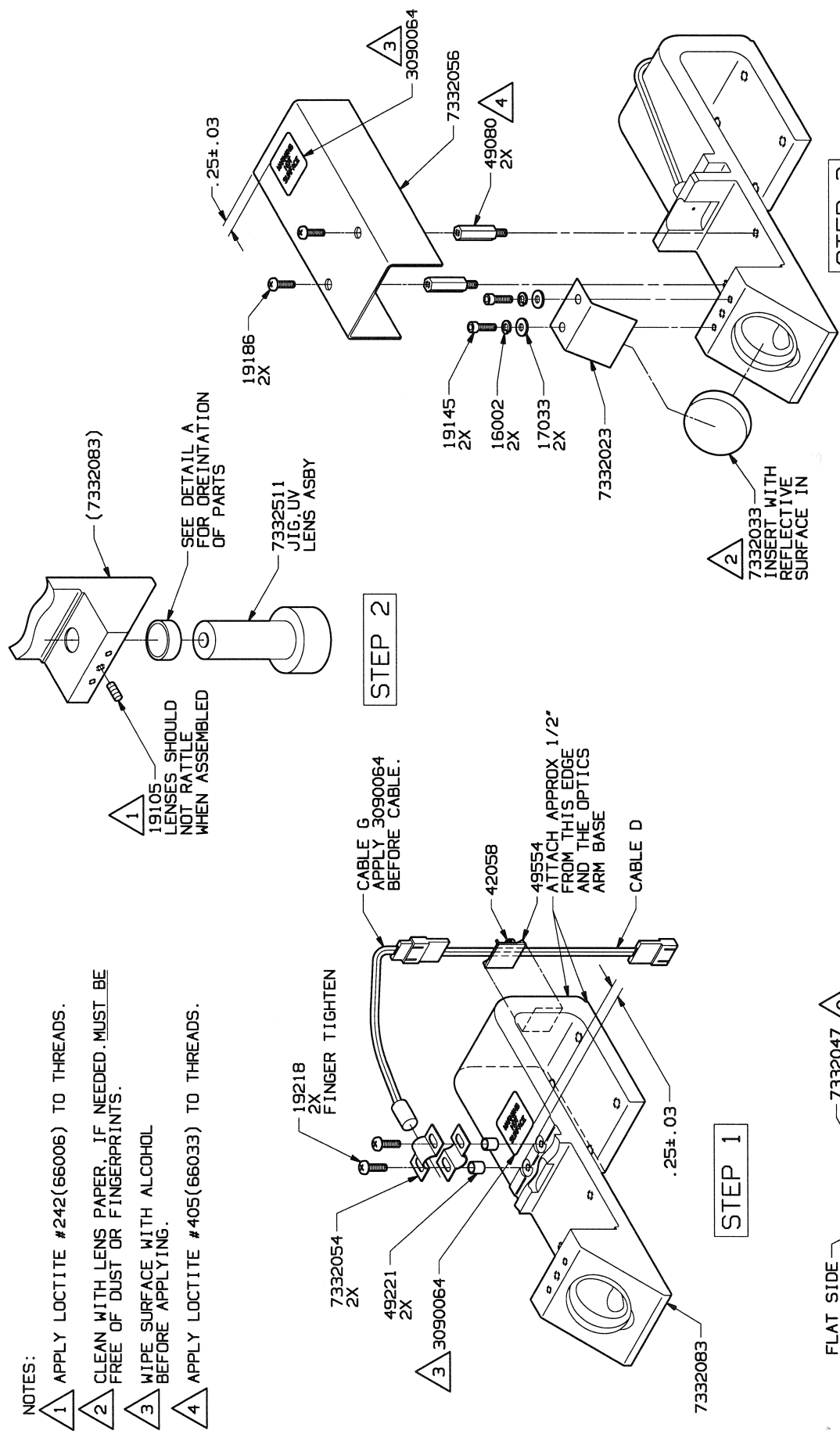
SIZE	DRAWING NO.	REV
C	7330523-AS	B
SCALE:	1/1	SHEET 1 OF 1

B	CHG VIEW & MFG LOCATION OF	49554	28351	11/20/96
A	RELEASE TO PRODUCTION		27082	1/12/96
REV	DESCRIPTION		ECO	DATE BY

A B C D E F G H I J

NOTES:

- 1 APPLY LOCTITE #242(66006) TO THREADS.
- 2 CLEAN WITH LENS PAPER, IF NEEDED, MUST BE FREE OF DUST OR FINGERPRINTS.
- 3 WIPE SURFACE WITH ALCOHOL BEFORE APPLYING.
- 4 APPLY LOCTITE #405(66033) TO THREADS.



TITLE: OPTIC ARM NARROW BEAM ASBY
SIZE DRAWING NO: C 7330524-AS
SCALE: 1/1
SHEET 1 OF 1

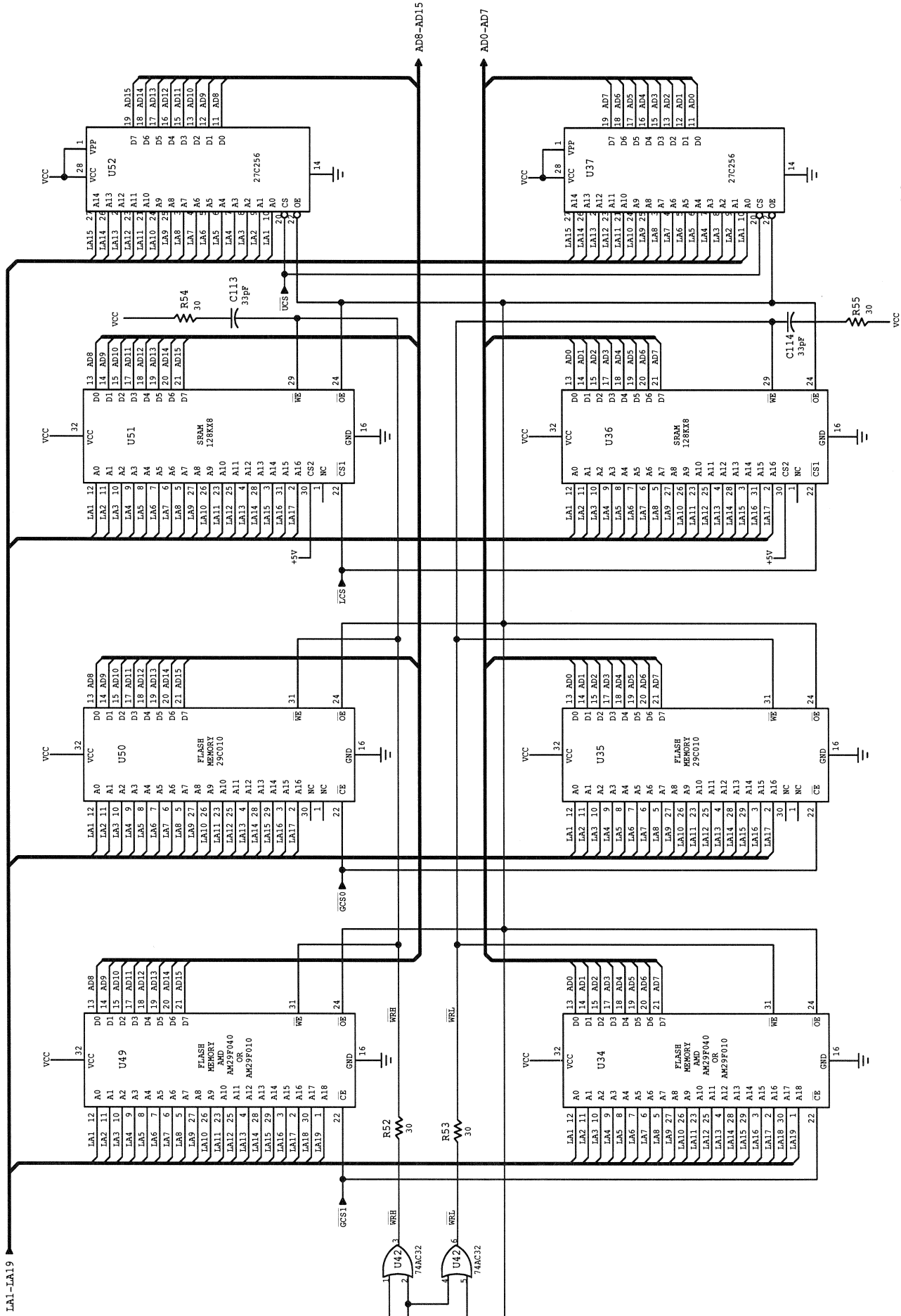
UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DRN BY: B. SMITH	1-5-96
PRODUCTION TOLERANCES	ENGR: B. BEDARD	1/15/96
.XX .010		
.XXX .005		
.XXX4 .005		
MATERIAL:	FINISH:	
DO NOT SCALE	REMOVE ALL BURRS	BREAK SHARP EDGES

REV	DESCRIPTION	ECO	DATE	BY
B	CHG VIEW & MFG LOCATION OF 49554	28351	11/20/96	BPS
A	RELEASE TO PRODUCTION	27082	1/12/96	BPS

Schematic Diagrams

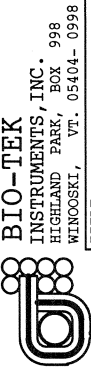
The following are the schematic diagrams describing the electrical circuits within the *ELx800* and its variations. These again are subject to change.

7330410-SC MAIN PCB ASBY
7330401-SC MOVING INTCON PCB ASBY
7330415-SC
7330414-SC
7330413-SC



MEMORY

REV A



APPROVALS	DATE	SCALE	DRAWING#
DRAWN	7/94		
CHECKED			
TITLE MAIN PCB			
(LESS FRONT END)			
SHEET 20F 8 7330410-SC			

AD0-AD7

BD0-BD7

VCC

20

AD0

AD1

AD2

AD3

AD4

AD5

AD6

AD7

B0

B1

B2

B3

B4

B5

B6

B7

BD0

BD1

BD2

BD3

BD4

BD5

BD6

BD7

DTR

G

74AC245

10

GND

DT

R56

30

U16

74AC32

GCS2+(56,58,60,62)
GCS2+(48,50,52,54)
GCS2+(40,42,44,46)
GCS2+(32,34,36,38)
GCS2+(24,26,28,30)
GCS2+(16,18,20,22)
GCS2+(8,10,12,14)
GCS2+(0,2,4,6)

ADHIGH
ADLOW
GAINCS
MDAC2
MDAC1
MDAC0

LA0

LA1

LA2

LA3

LA4

LA5

LA6

LA7

LA8

LA9

LA10

LA11

LA12

LA13

LA14

LA15

LA16

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LA22

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LA25

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LA28

LA29

LA30

LA31

LA32

LA33

LA34

LA35

I/O BUS BUFFERING

TIME
INFORM
PRINT
KEYOUT
KEYIN
DISPDATA
GCS3+14
GCS3+12
GCS3+10
GCS3+8
GCS3+6
GCS3+4
GCS3+2
GCS3+0

LA0

LA1

LA2

LA3

LA4

LA5

LA6

LA7

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LA10

LA11

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LA14

LA15

LA16

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LA31

LA32

LA33

LA34

LA35

LA36

LA37

LA38

LA39

I/O CHIP SELECT

NOTE: RESISTOR NETWORK RN2
HAS A VALUE OF 180 OHM.

SPARE GATES

DB25 on rear panel

DCD
RX
TX
DTR
GND
DSR
RTS
CTS
R1

TX
RX
RTS
CTS
NC
V+

TX
RX
RTS
CTS
NC
V+

TX
RX
RTS
CTS
NC
V+

TX
RX
RTS
CTS
NC
V+

TX
RX
RTS
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RTS
CTS
NC
V+

TX
RX
RTS
CTS
NC
V+

LCD INTERFACE

ASYNCHRONOUS SERIAL PORT



REV A

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TITLE MAIN PCB
(LESS FRONT END)

APPROVALS
DATE 07/94
SCALE
DRAWN GFW
CHECKED

SHEET 3 OF 8
7330410-SC

+12v

BP1

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2

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PRINTER INTERFACE

VCC

R50

15K

R67

1K

FSTROBE

1

2

3

4

5

6

7

8

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10

11

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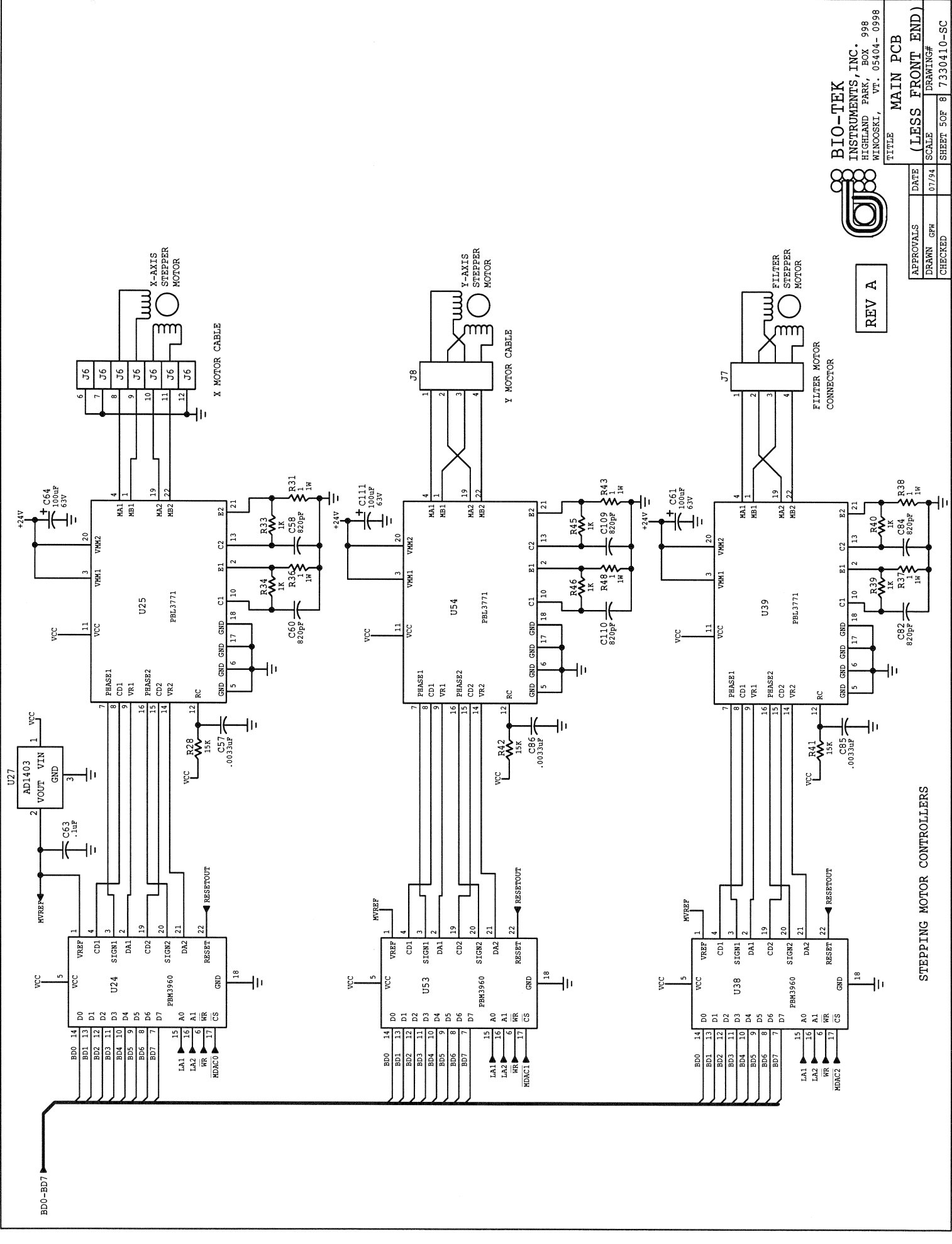
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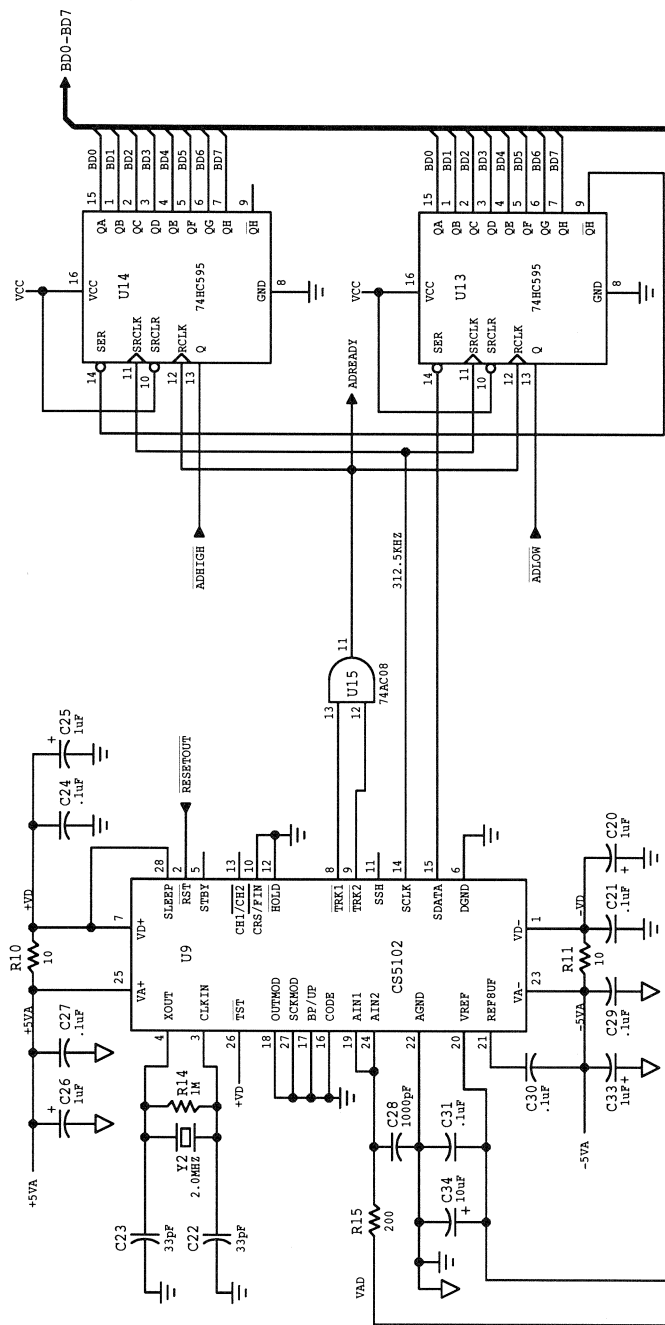


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WINOOSKI, VT. 05404- 0998

REV A

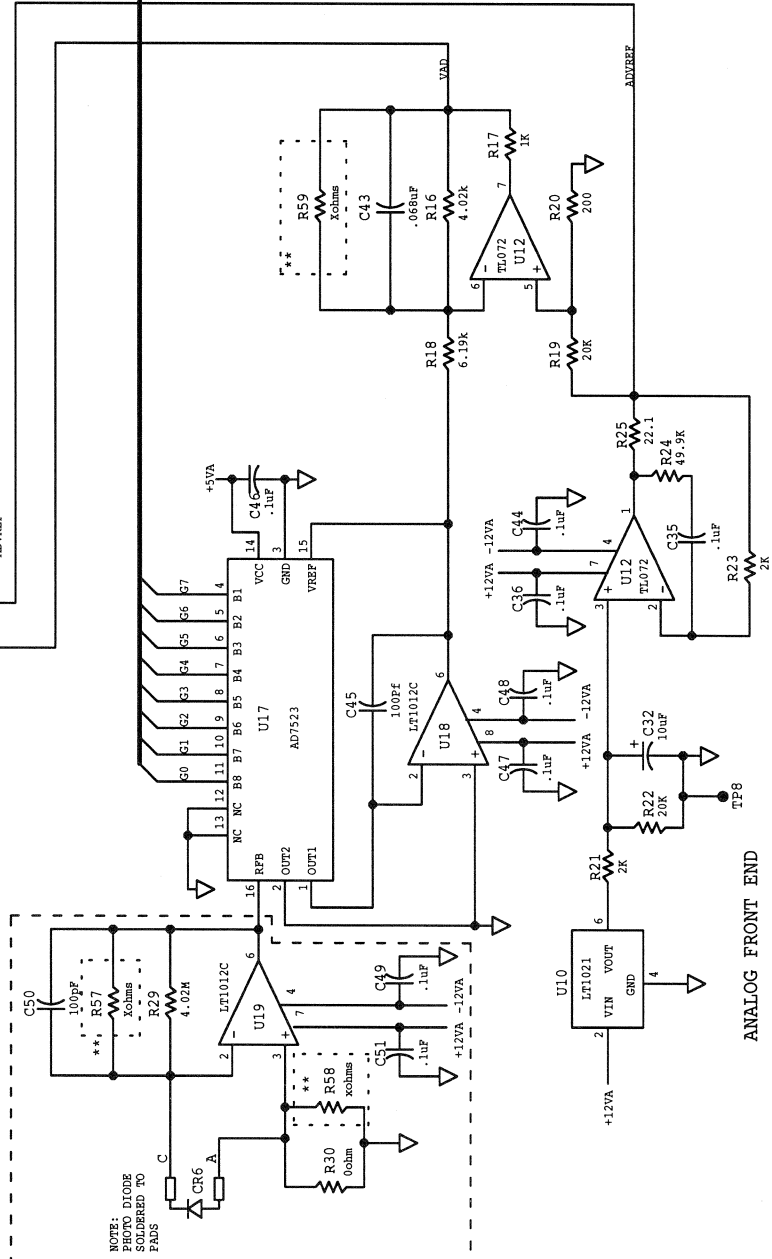
TITILE		MAIN PCB	
APPROVALS	DATE	(LESS FRONT END)	
DRAWN	07/94	SCALE	DRAWING#
CHECKED		SHEET	50F 8 7330410-SC

STEPPING MOTOR CONTROLLERS



16 BIT A/D INTERFACE

COMPONENTS WITHIN MARKED AREA ARE NOT INSTALLED.
TWO POSSIBLE REMOTE CURRENT AMPS CAN BE USED WITH
THIS CIRCUIT. REFERENCE BOM, 7330410-AS AND
7330404-SC FOR ADDITIONAL INFORMATION.



ANALOG FRONT END

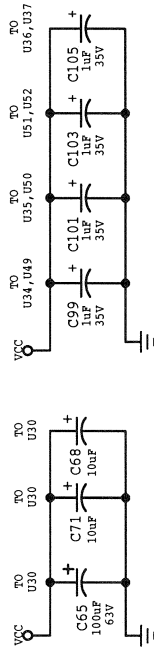
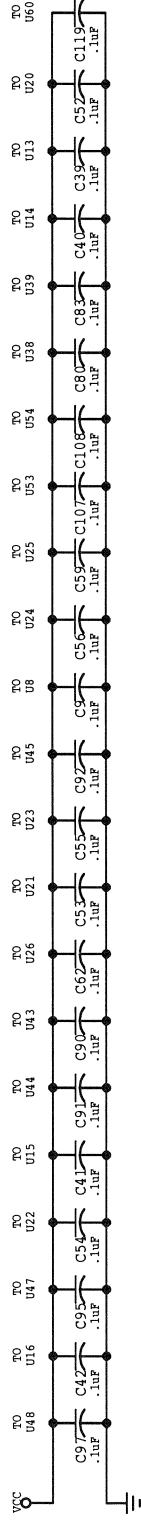
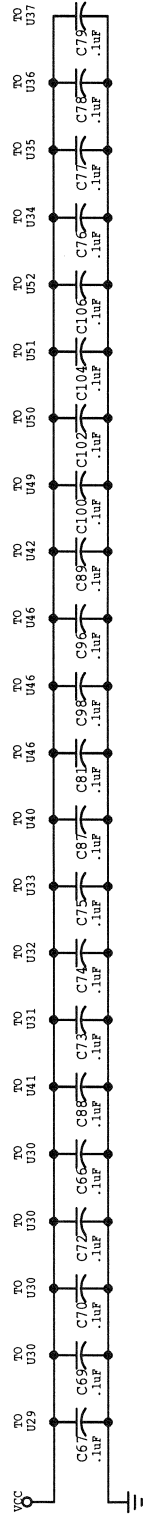
REV B



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APPROVALS	DATE	SCALE	DRAWING#
DRAWN	07/94	SCALE	DRAWING#
CHECKED			

TITLE MAIN PCB
SHEET 60F 8 7330410-SC



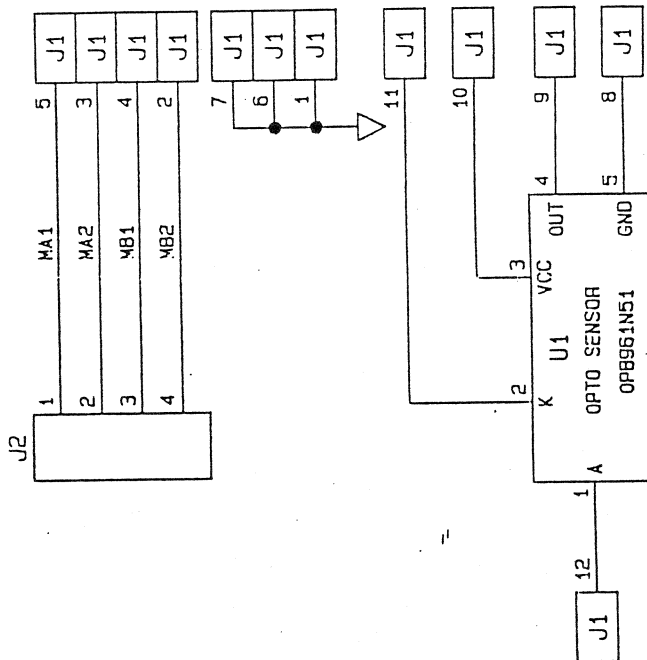
BYPASS CAPACITORS



REV A

BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

TITLE MAIN PCB		
APPROVALS	DATE	(LESS FRONT END)
DRAWN GFW	07/94	DRAWING#
CHECKED		SHEET 80F 8 7330410-SC



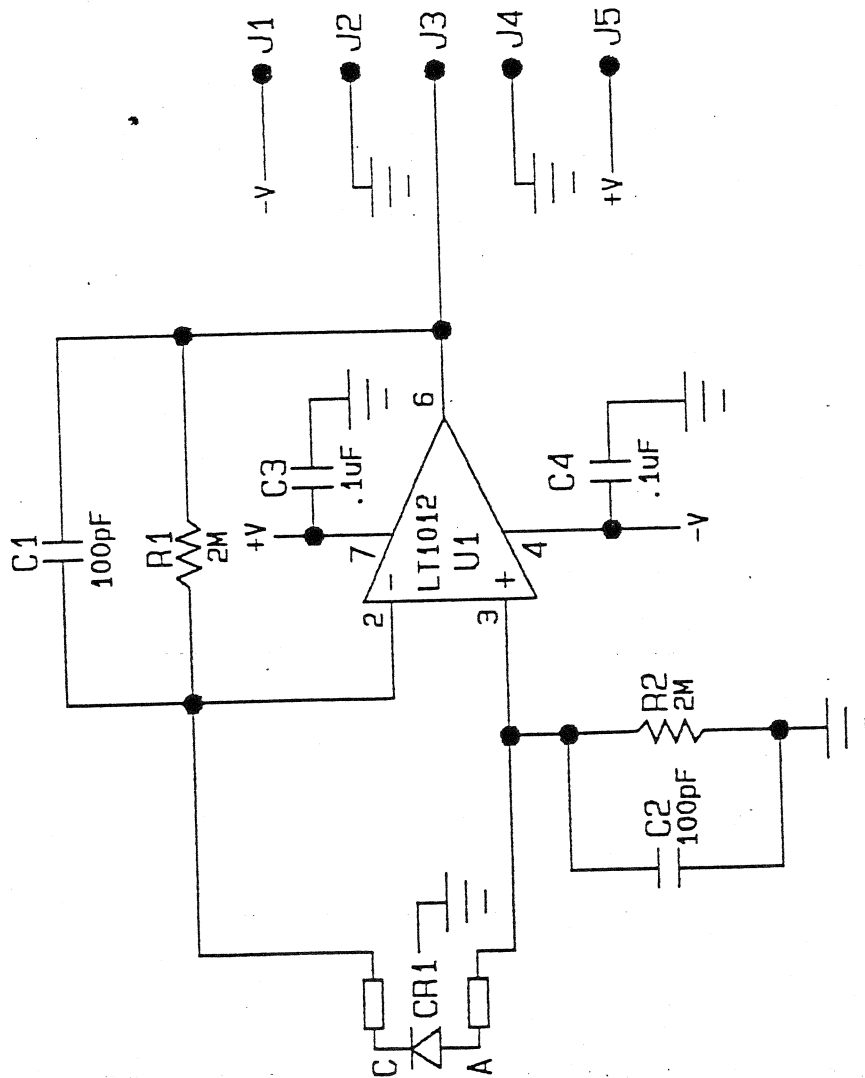
NOV 1996
 BT
 10/10/96



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 INSTRUMENTS, INC.
 HIGHLAND PARK, BOX 998
 WINOOSKI, VT. 05404-0998

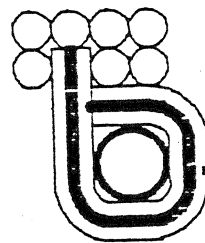
TITLE	
MOVING INTCON PCB	
DRAWING#	
7330401-SC	
SHEET 1 OF 1	

APPROVALS		DATE	
25462	9/13/94	SAW	08/94
RELEASE TO PRODUCTION		SAW	
BY PRODUCTION		BY	



NOV 1996

BY
BIO-TEK INSTRUMENTS, INC.
APPROVED



BIO-TEK

INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE PCB CURRENT

AMPLIFIER ASBY

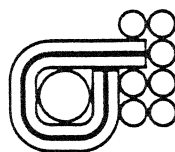
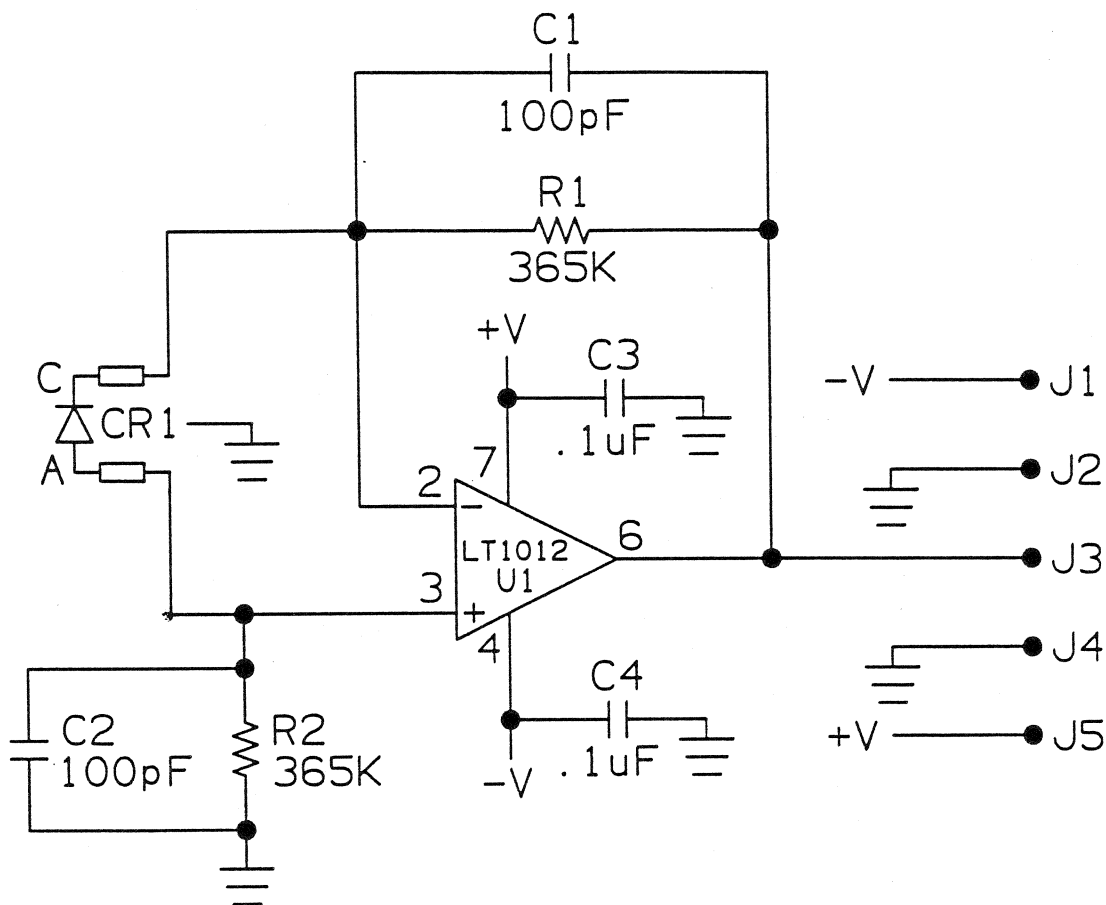
SCALE DRAWING#

SHEET 10F 1

7330404-SC

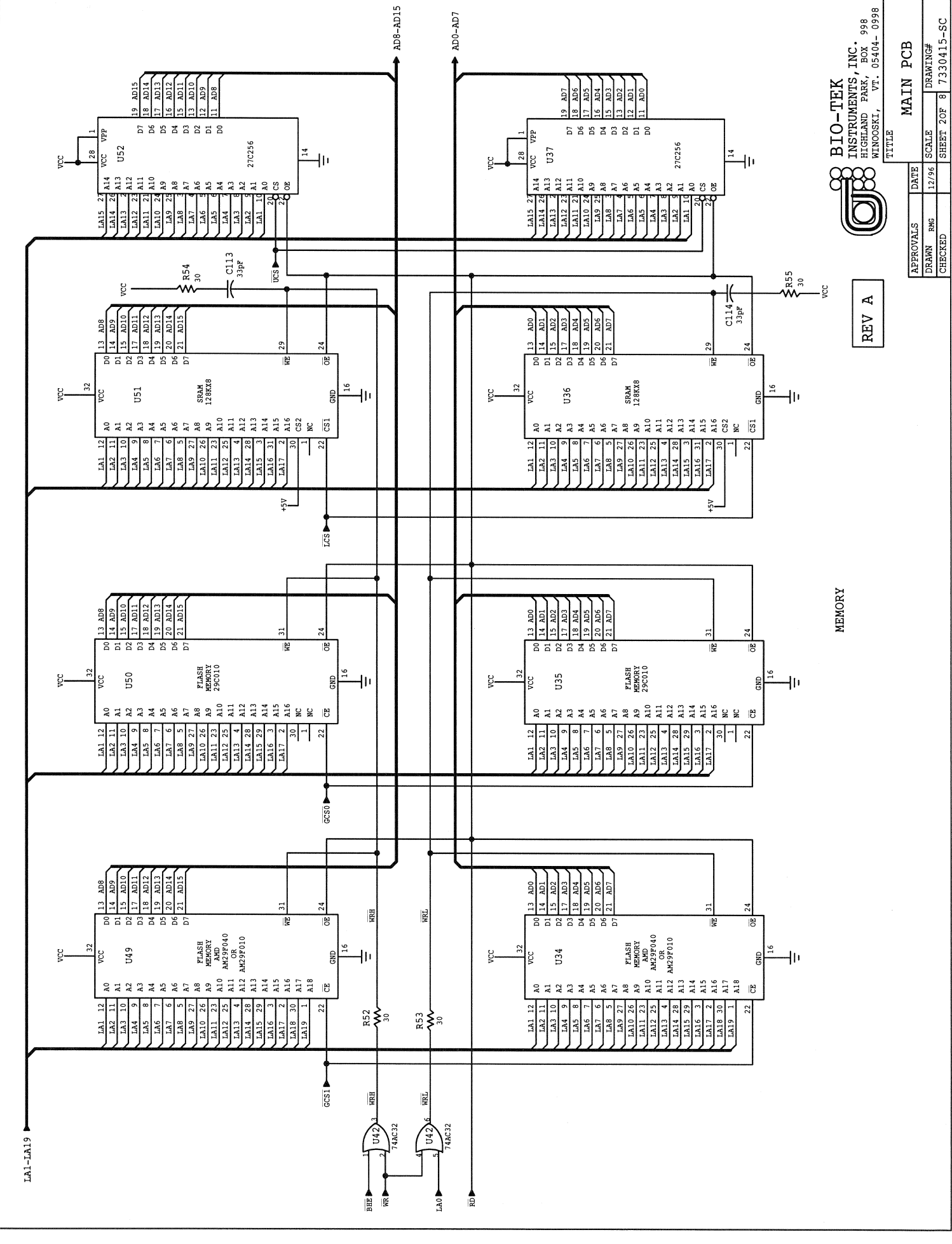
APPROVALS		DATE
DRAWN	SAW	8/02/95
RELEASE TO PRODUCTION		9/12/95
A		26698

REV	DESCRIPTION	ECO	DATE	BY
A	RELEASE TO PRODUCTION	27374	4/2/96	BPS




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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES PRODUCTION TOLERANCES .X±.015 ANGULAR TOL. ±2° .XX±.010 SURFACE FINISH 63 .XXX±.005	SIGNATURES	DATE	TITLE PCB FRONT END UV CUR AMP ASBY	
	DRN BY: SAW	8/2/95		
	ENGR			
MATERIAL:	THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.			SIZE
FINISH:				DRAWING NO.
DO NOT SCALE				REV
BREAK SHARP EDGES	SCALE: NONE		SHEET 1 OF 1	
	A		7330413-SC	
			A	



MEMORY

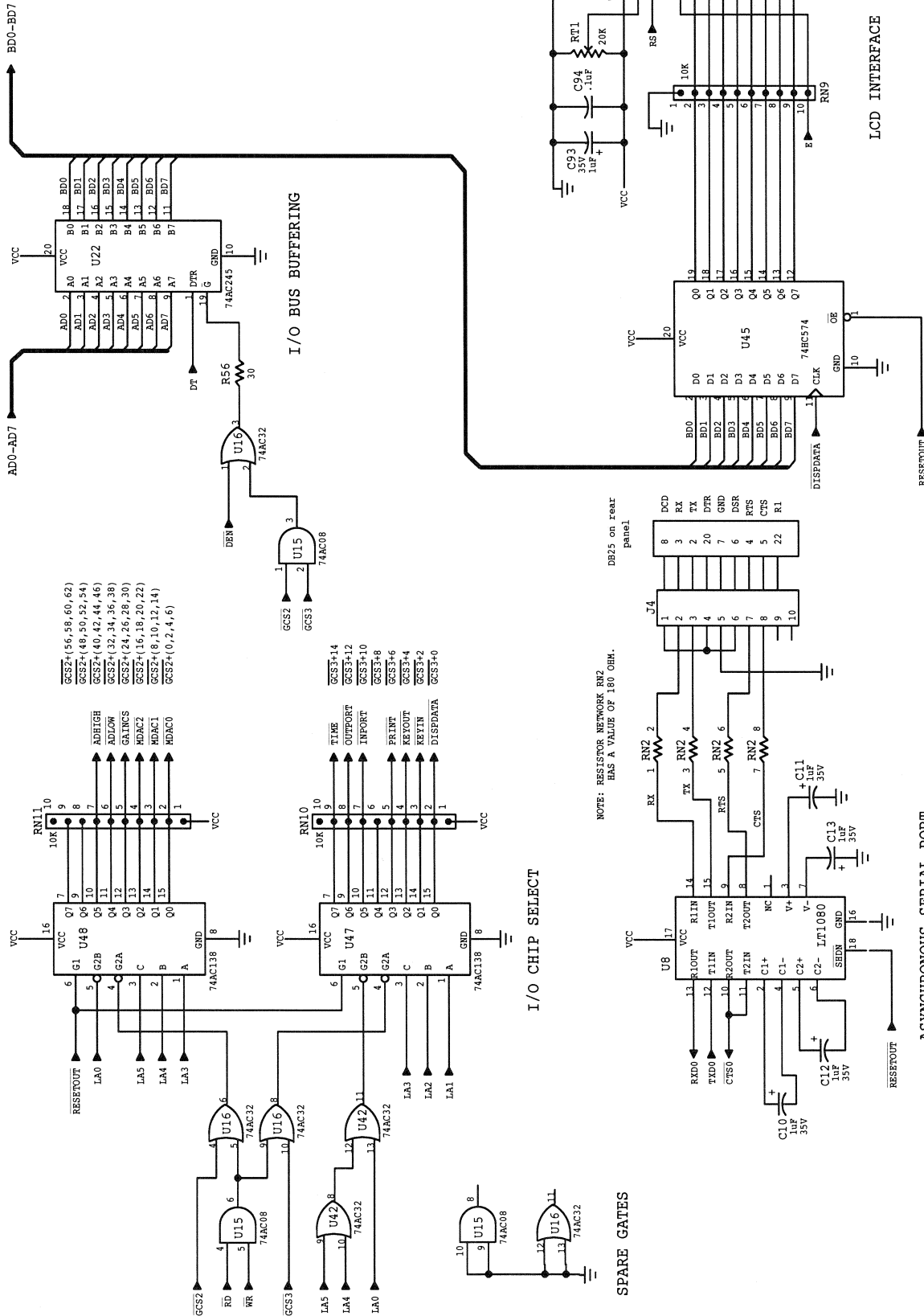
REV A



BIO-TEK
INSTRUMENTS, INC.
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WINOOSKI, VT. 05404-0998

APPROVALS		DATE	TITLE	
DRAWN	RMG	12/96	SCALE	DRAWING#
CHECKED			SHEET 20F 8	7330415-SC

MAIN PCB



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REV A

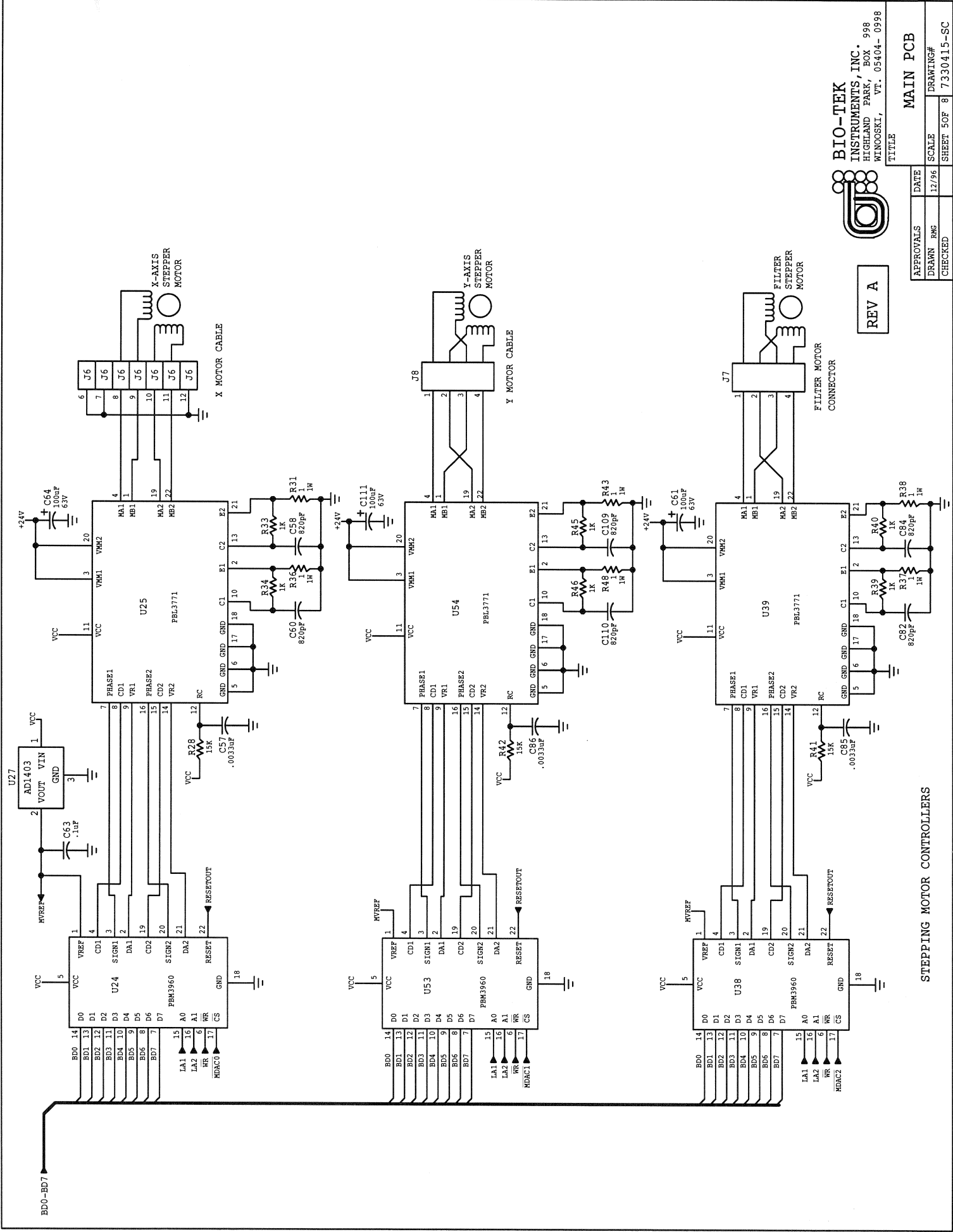
TITLE

MAIN PCB

APPROVALS	DATE
DRAWN RMG	12/96
CHECKED	

SCALE	DRAWING#
	7330415-SC

SHEET 3 OF 8



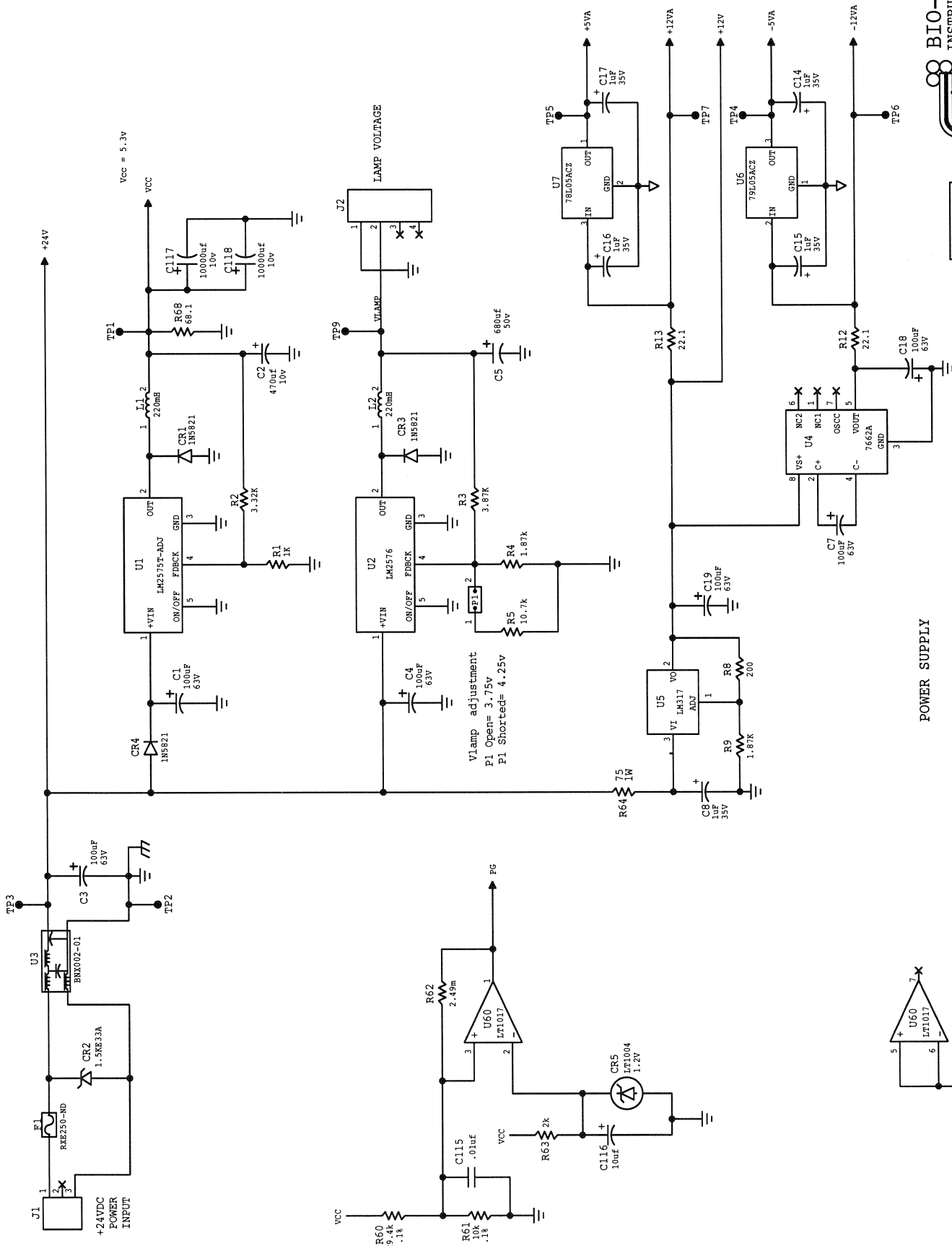
BIO-TEK
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WINOOSKI, VT. 05404-0998

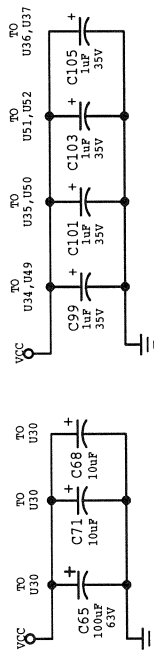
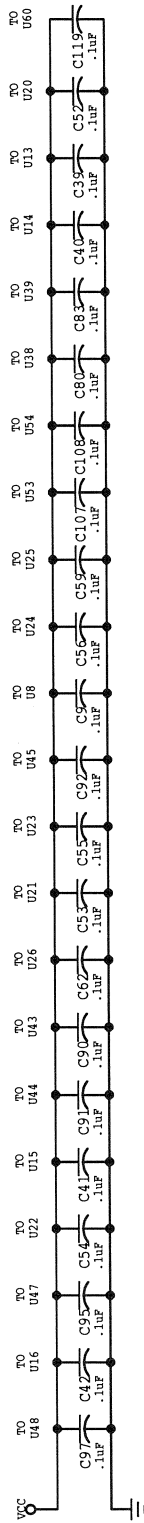
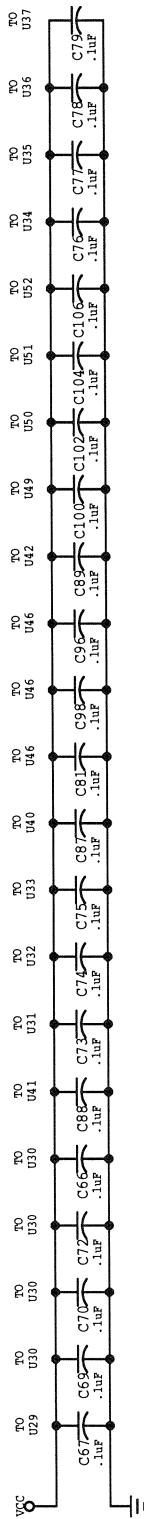
REV A

STEPPING MOTOR CONTROLLERS

APPROVALS		DATE	TITLE	
CHECKED	RMG	12/96	SCALE	DRAWING#
			SHEET 5 OF 8	7330415-5C

MAIN PCB





BYPASS CAPACITORS



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HIGHLAND PARK, BOX 998
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REV A

APPROVALS		DATE		MAIN PCB		TITLE
DRAWN RMG		12/96				
CHECKED		SCALE				
				DRAWING#		
				SHEET 80F 8		7330415-SC

APPROVALS	DATE
DRAWN RMG	12/96
CHECKED	

Bill of Materials

The following are the bills of material used in building the *ELx800* and its variations. These documents are also subject to change.

<i>ELX800</i>	X-Y Reader
<i>ELX800NB</i>	X-Y Reader Narrow Beam
<i>ELX800UV</i>	X-Y Reader UV
<i>ELX800G</i>	X-Y Reader Generic
7330002	Shipping accessories
7330005	Final assembly
7330006	Final Assembly UV
7330007	Final Assembly Narrow Beam
7330008	Final Assembly Generic XY
7330009	Kit,services,ELx800
7330410	Main PCB assembly (obsolete)
7330401	Moving interconnect PCB assembly
7330413	Front end UV/NB current amp assembly
7330414	Front end current amp assembly
7330415	Main PCB assembly
7330500	Generic final kit
7330501	Cable lamp asby
7330502	Cable motor Y axis asby
7330503	Cable power input asby
7330504	Cable lamp extension asby
7330506	Cable opto 14L asby
7330507	Cable X axis motor
7330508	Mech pre assembled asby
7330509	Cable Lamp UV assembly (this is the replacement part # for UV and NB units)
7330513	Bulb with wrench replacement asby(this is the replacement part # for non UV or NB units)
7330515	Carrier asby
7330522	Optics arm asby
7330523	Optics arm UV asby
7330524	Optics arm narrow beam asby
8050509	Cable filter wheel motor asby

BILL OF MATERIALS REPORT

SHIPPING ACCESSORY LISTS

PART: ELX800

DESC: X Y READER

AS OF: 6/13/98

REV: Y

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16016	6.00	LKWSHR #8 HELICAL SPR SS	A	
17054	6.00	WSHR FL .188IDX.438ODX.049 SS	C	
19017	6.00	SCR SOCK CAP 8-32X3/8 BLK	A	
19159	4.00	SCR PLASTIC HEAD 6-32X.31	A	
2872086	1.00	DUMMY FILTER	B	IN POSITION 5
2874405	1.00	FILTER ASBY 405NM READER	D	IN POSITION 1
2874450	1.00	FILTER ASBY 450NM READER	C	IN POSITION 2
2874490	1.00	490NM READER FILTER ASBY	C	IN POSITION 3
2874630	1.00	FILTER ASBY 630NM READER	C	IN POSITION 4
3070186	0.00	SOFTWARE KCJR PC-DOS,V1.14	G	TOOL ONLY
49748	1.00	FSTNR 8-32X3/8 BLACK SLOT	A	
7330002	1.00	SHIPPING ACCESSORIES	D	
7330005	1.00	FINAL ASBY	AF	
7330005-TP	0.00	-FINAL ASBY	O	DOCUMENT ONLY
7330202	0.00	FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330202-SP	0.00	-FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330203	0.00	FRMWR DWNLD ASAY CONFIG V2.80	G	TOOL ONLY
7330203-SP	0.00	-FRMWR DWNLD ASSY CONFIGV2.80	G	TOOL ONLY
7331015	1.00	DECLARATION OF CONFORMITY	B	
7331024	1.00	OVRLY 800 FRONT	B	
7332000	1.00	WHEEL FILTER	B	
7332022	1.00	COVER FILTER WHEEL	B	
7771010	1.00	LABEL ETL UL CSA 1010.1 LISTED	B	INSTALLED BY CERTIFIED TECH
7771012	1.00	TAG S/N WITH CE MARK	A	INSTALLED BY CERTIFIED TECH
8290202	0.00	SFTWR INSTL DEF RDR PRO V1.32	K	TOOL ONLY

BILL OF MATERIALS REPORT

SHIPPING ACCESSORY LISTS

PART: ELX800NB

DESC: X Y READER NARROW BEAM

REV: X

AS OF: 6/13/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16016	6.00	LKWSHR #8 HELICAL SPR SS	A	
17054	6.00	WSHR FL .188IDX.438ODX.049 SS	C	
19017	6.00	SCR SOCK CAP 8-32X3/8 BLK	A	
19159	4.00	SCR PLASTIC HEAD 6-32X.31	A	
2872086	1.00	DUMMY FILTER	B	IN POSITION 5
2874405	1.00	FILTER ASBY 405NM READER	D	IN POSITION 1
2874450	1.00	FILTER ASBY 450NM READER	C	IN POSITION 2
2874490	1.00	490NM READER FILTER ASBY	C	IN POSITION 3
2874630	1.00	FILTER ASBY 630NM READER	C	IN POSITION 4
3070186	0.00	SOFTWARE KCJR PC-DOS,V1.14	G	TOOL ONLY
49748	4.00	FSTNR 8-32X3/8 BLACK SLOT	A	
7330002	1.00	SHIPPING ACCESSORIES	D	
7330005-TP	0.00	-FINAL ASBY	O	DOCUMENT ONLY
7330007	1.00	FINAL ASBY NARROW BEAM	X	
7330202	0.00	FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330202-SP	0.00	-FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330209	0.00	FRMWR CONFIG ELX800NB V2.80	F	TOOL ONLY
7330209-SP	0.00	-FRMWR CONFIG ELX800NB V2.80	F	TOOL ONLY
7331015	1.00	DECLARATION OF CONFORMITY	B	
7331026	1.00	OVRLY 800NB FRONT	B	
7332000	1.00	WHEEL FILTER	B	
7332022	1.00	COVER FILTER WHEEL	B	
7350005	1.00	EXCEL/RDR DATA LG ASBY	C	PUT IN BOX W/READER
7771010	1.00	LABEL ETL UL CSA 1010.1 LISTED	B	INSTALLED BY CERTIFIED TECH
7771012	1.00	TAG S/N WITH CE MARK	A	INSTALLED BY CERTIFIED TECH
8290202	0.00	SFTWR INSTL DEF RDR PRO V1.32	K	TOOL ONLY

BILL OF MATERIALS REPORT

SHIPPING ACCESSORY LISTS

PART: ELX800UV

DESC: X Y READER UV

AS OF: 6/13/98

REV: X

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16016	6.00	LKWSHR #8 HELICAL SPR SS	A	
17054	6.00	WSHR FL .188IDX.438ODX.049 SS	C	
19017	6.00	SCR SOCK CAP 8-32X3/8 BLK	A	
19159	4.00	SCR PLASTIC HEAD 6-32X.31	A	
2874340	1.00	FILTER ASBY 340NM READER	B	IN POSITION 5
2874405	1.00	FILTER ASBY 405NM READER	D	IN POSITION 1
2874450	1.00	FILTER ASBY 450NM READER	C	IN POSITION 2
2874490	1.00	490NM READER FILTER ASBY	C	IN POSITION 3
2874630	1.00	FILTER ASBY 630NM READER	C	IN POSITION 4
3070186	0.00	SOFTWARE KCJR PC-DOS,V1.14	G	TOOL ONLY
49748	4.00	FSTNR 8-32X3/8 BLACK SLOT	A	
7330002	1.00	SHIPPING ACCESSORIES	D	
7330005-TP	0.00	-FINAL ASBY	O	DOCUMENT ONLY
7330006	1.00	FINAL ASBY UV	X	
7330007	1.00	FINAL ASBY NARROW BEAM	X	
7330202	0.00	FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330202-SP	0.00	-FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330208	0.00	FRMWR CONFIG ELX800UV V2.80	F	TOOL ONLY
7330208-SP	0.00	-FRMWR CONFIG ELX800UV V2.80	F	TOOL ONLY
7331015	1.00	DECLARATION OF CONFORMITY	B	
7331027	1.00	OVRLY 800UV FRONT	B	
7332000	1.00	WHEEL FILTER	B	
7332022	1.00	COVER FILTER WHEEL	B	
7771010	1.00	LABEL ETL UL CSA 1010.1 LISTED	B	INSTALLED BY CERTIFIED TECH
7771012	1.00	TAG S/N WITH CE MARK	A	INSTALLED BY CERTIFIED TECH
8290202	0.00	SFTWR INSTL DEF RDR PRO V1.32	K	TOOL ONLY

BILL OF MATERIALS REPORT

SHIPPING ACCESSORY LISTS

PART: ELX800G

DESC: X Y READER GENERIC

AS OF: 6/13/98

REV:

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16016	6.00	LKWSHR #8 HELICAL SPR SS	A	
17054	6.00	WSHR FL .188IDX.438ODX.049 SS	C	
19017	6.00	SCR SOCK CAP 8-32X3/8 BLK	A	
19159	4.00	SCR PLASTIC HEAD 6-32X.31	A	
2872086	1.00	DUMMY FILTER	B	IN POSITION 5
2874405	1.00	FILTER ASBY 405NM READER	D	IN POSITION 1
2874450	1.00	FILTER ASBY 450NM READER	C	IN POSITION 2
2874490	1.00	490NM READER FILTER ASBY	C	IN POSITION 3
2874630	1.00	FILTER ASBY 630NM READER	C	IN POSITION 4
3070186	0.00	SOFTWARE KCJR PC-DOS,V1.14	G	TOOL ONLY
49748	1.00	FSTNR 8-32X3/8 BLACK SLOT	A	
7330002	1.00	SHIPPING ACCESSORIES	D	
7330005	1.00	FINAL ASBY	AF	
7330008	1.00	FINAL ASBY GENERIC XY	Y	
7330005-TP	0.00	-FINAL ASBY	O	DOCUMENT ONLY
7330202	0.00	FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330202-SP	0.00	-FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330211	0.00	FRMWR CONFIG ELX800G V2.01	E	TOOL ONLY
7330211-SP	0.00	-FRMWR CONFIG ELX800G V2.01	E	TOOL ONLY
7331015	1.00	DECLARATION OF CONFORMITY	B	
7332000	1.00	WHEEL FILTER	B	
7332022	1.00	COVER FILTER WHEEL	B	
7771010	1.00	LABEL ETL UL CSA 1010.1 LISTED	B	INSTALLED BY CERTIFIED TECH
7771012	1.00	TAG S/N WITH CE MARK	A	INSTALLED BY CERTIFIED TECH
8290202	0.00	SFTWR INSTL DEF RDR PRO V1.32	K	TOOL ONLY
99125	1.00	LABEL 1"X1/2" CONTINUOUS	B	MARK WITH MODEL NUMBER

BILL OF MATERIALS REPORT

SHIPPING ACCESSORY LISTS

PART: 7330002

DESC: SHIPPING ACCESSORIES

AS OF: 6/13/98

REV: D

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
19337	2.00	SEMS 6-32X1 1/4 ST PHIL ITOOTH	A	FOR SHIPPING BLOCK
48255	0.01 FT	TAPE LAB 1" WIDE YELLOW	A	
49746	1.00	CORD SHOCK W/HOOKS 18L	B	
61062	1.00	PWR SUPPLY 24VDC DESKTOP	E	
71072	1.00	CABLE, FOR PRINTER, IBMPC 6FT	A	IN BOX WITH UNIT
7331000	1.00	OPERATOR'S MANUAL ELX800	G	
7331006	1.00	LABEL UNPACKING INSTRUCTIONS	A	
7332040	1.00	COVER DUST	A	IN BOX WITH UNIT
7332041	1.00	BLOCK SHIPPING SHAFT RETAIN	A	
7332062	1.00	SHIPPING BOX END CAPS SHELF	A	
91016	0.01 FT	TAPE REINF GUMMED 3" BRN	A	
91083	1.00	BUBBLE BAG 8X11.5	A	FOR POWER SUPPLY
94075	1.00	SHIPPING DOCUMENT KIT	F	INSERTED BY SHIPPING
98085	1.00	BAG POLY 26X32 2 MIL	A	FOR UNIT
98145	1.00	SCREWDRIVER COMB PHIL/SLOT	A	
99204	1.00	RUBBER BAND 7 X 1/8 X 1/16	A	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHEDGOODS

PART: 7330005

DESC: FINAL ASBY

AS OF: 6/15/98

REV:AF

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330005-AS	0.00	-FINAL ASBY	AB	DOCUMENT ONLY
7330005-DS	0.00	-FINAL ASBY DATA SHEET	I	DOCUMENT ONLY
7330414	1.00	PCB FRONT END CURRENT AMP ASBY	F	
7330415	1.00	MAIN PCB ASBY	E	
7330500	1.00	GENERIC FINAL KIT	T	
7330508	1.00	MECH PRE ASSEMBLED ASBY	M	
7330528	1.00	CABLE CURRENT AMPLIFIER	A	CABLE I
7331023	1.00	OVRLY KEYBOARD READER	B	
7332009	1.00	COVER TOP	I	
7332030	1.00	PLATE BASE PAINTED	I	
7770102	1.00	LABEL "FCC COMPLIANCE"	A	
9001018	1.00	LABEL IN-VITRO DIAG USE	A	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330006

DESC: FINAL ASBY UV

REV: X

AS OF: 6/15/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42151	1.00	JUMPER .100 .025 SQ PINS	C	ON P1
7330005-AS	0.00	-FINAL ASBY	AB	DOCUMENT ONLY
7330005-DS	0.00	-FINAL ASBY DATA SHEET	I	DOCUMENT ONLY
7330413	1.00	PCB FRONT END UV CUR AMP ASBY	F	
7330415	1.00	MAIN PCB ASBY	E	
7330500	1.00	GENERIC FINAL KIT	T	
7330518	1.00	MECH PRE ASSEMBLED UV ASBY	G	
7330528	1.00	CABLE CURRENT AMPLIFIER	A	CABLE I
7331023	1.00	OVRLY KEYBOARD READER	B	
7332009	1.00	COVER TOP	I	
7332030	1.00	PLATE BASE PAINTED	I	
7770102	1.00	LABEL "FCC COMPLIANCE"	A	
9001018	1.00	LABEL IN-VITRO DIAG USE	A	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330007

DESC: FINAL ASBY NARROW BEAM

REV: X

AS OF: 6/15/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42151	1.00	JUMPER .100 .025 SQ PINS	C	ON P1
7330005-AS	0.00	-FINAL ASBY	AB	DOCUMENT ONLY
7330005-DS	0.00	-FINAL ASBY DATA SHEET	I	DOCUMENT ONLY
7330414	1.00	FRONT END CURRENT AMP ASBY	F	
7330415	1.00	MAIN PCB ASBY	E	
7330500	1.00	GENERIC FINAL KIT	T	
7330517	1.00	MECH PRE ASSEMBLED NB ASBY	H	
7330528	1.00	CABLE CURRENT AMPLIFIER	A	CABLE I
7331023	1.00	OVRLY KEYBOARD READER	B	
7332009	1.00	COVER TOP	I	
7332030	1.00	PLATE BASE PAINTED	I	
7332048	1.00	SPACER OPTIC ARM MOUNTING	A	
7770102	1.00	LABEL "FCC COMPLIANCE"	A	
9001018	1.00	LABEL IN-VITRO DIAG USE	A	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330008

DESC: FINAL ASBY GENERIC XY

REV: Y

AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330005-AS	0.00	-FINAL ASBY	AB	DOCUMENT ONLY
7330005-DS	0.00	-FINAL ASBY DATA SHEET	I	DOCUMENT ONLY
7330414	1.00	FRONT END CURRENT AMP ASBY	F	
7330500	1.00	GENERIC FINAL KIT	T	
7330508	1.00	MECH PRE ASSEMBLED ASBY	M	
7331010	1.00	OVRLY KEYBOARD GENERIC	E	
7332030	1.00	PLATE BASE PAINTED	I	
7332050	1.00	COVER TOP GENERIC	B	
7770102	1.00	LABEL "FCC COMPLIANCE"	A	
9001018	1.00	LABEL IN-VITRO DIAG USE	A	
7330528	1.00	CABLE CURRENT AMPLIFIER	A	CABLE I
7330415	1.00	MAIN PCB ASBY	E	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330009

DESC: KIT, SERVICE, ELX800

REV: L

AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
04018	1.00	LCD 2X24 SUPERTWIST DISPLAY	C	
3122023	1.00	MOTOR,STPR 1.8DEG,FLAT SHAFT	G	
3402000	2.00	LENS, BICONVEX BK7	C	
3740008	1.00	BOX, 18.50 X 17.75 X 12.625	A	
41038	1.00	BELT TIMING 320T 3/16W D	C	
41039	1.00	BELT TIMING 340T 3/16W B	B	
54013	2.00	SWITCH SPST ROCKER PANEL MNT	B	
61062	1.00	PWR SUPPLY 24VDC DESKTOP	E	
68019	1.00	MOTOR STEPER SIZE 17 SGL SFT	D	
68020	1.00	FILTER WHEEL MOTOR	A	
71154	1.00	FLEX CIRCUIT 12 COND 8.00" SR	A	
7330014	1.00	KIT SVCE PHOTODIODE REPLACMENT	C	
7330015	1.00	KIT SVCE DAUGHTER MOD REPLMT	B	
7330202	0.00	FRMWR DOWNLOADED CODE V2.83	N	
7330203	0.00	FRMWR DWNLD ASSAY CONFIG V2.80	G	
7330208	0.00	FRMWR CONFIG ELX800UV V2.80	F	
7330209	0.00	FRMWR CONFIG ELX800NB V2.80	F	
7330211	0.00	FRMWR CONFIG ELX800G V2.01	E	
7330415	1.00	MAIN PCB ASBY	E	
7330401	1.00	MOVING INTCON PCB ASBY	A	
7330501S	2.00	SVCE CABLE LAMP ASBY	C	
7330516	2.00	BULB UV/NB REPLACE ASBY	A	
7330528	1.00	CABLE CURRENT AMPLIFIER	A	CABLE I
7331005	1.00	SERVICE MANUAL	B	
7331023	1.00	OVRLY KEYBOARD READER	B	
7332008	1.00	SPRING MICROPLATE RETAINING	C	
7332009	1.00	COVER TOP	I	
7332013	1.00	CARRIER MICROPLATE	F	
7332032	1.00	LENS OPTICAL	A	
7332033	1.00	MIRROR OPTICAL	B	
7332500	1.00	JIG FILTER WHEEL MOTOR SPACER	A	
7332508	1.00	JIG AUTOCAL	E	
8290006	1.00	KIT FIELD SOFTWARE UPGRADE	D	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330401

DESC: MOVING INTCON PCB ASBY

REV: A

AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330401-AS	0.00	-MOVING INTCON PCB ASBY	A	DOCUMENT ONLY
7330401-SC	0.00	-MOVING INTCON PCB ASBY SCHEM	A	DOCUMENT ONLY
7331401	1.00	MOVING INTCON PCB	A	
28076	1.00	OPTICAL SENSOR PCB MT	A	U1
42332	1.00	HEDR 4-P .100 RTANG POLARIZED	B	J2
42552	1.00	CONN 12P .049 RT STR RLF	A	J1

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330410

DESC: OBSOLETE SEE 7330415

REV: J

AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
21010	3.00	DIODE IN5821 SCHOTTKY 30V 1/4W	B	CR1,3,4
23013	1.00	OP AMP LT1012CN8 SINGLE	B	U18
23021	1.00	VOLT REG +ADJ 1.5A 317	C	U5
23026	1.00	VOLT REG +5V 78L05A	A	U7
23029	1.00	VOLT REG -5V 79L05	A	U6
23072	1.00	VOLT REG LM2575T	C	U1
23092	1.00	VOLT REG ADJ LM2576 SWITCHER	A	U2
25027	2.00	IC 74HC595 SHIFT REG 8BIT 3ST	B	U13,14
25051	1.00	IC 74LS04 HEX INVERTER	D	U41
25084	2.00	IC 74HC541 TS OCTAL BFR NONINV	E	U23,43
25086	5.00	IC 74HC574 OCTAL D FLIP-FLOP	C	U20,21,26,44,45
25094	1.00	IC L7662CPA NEG CONVERTER	B	U4
25106	1.00	IC 74AC245 OCTAL TRANSCEIVER	F	U22
25107	2.00	IC 74AC32 QUAD 2-INPUT OR GATE	E	U16,42
25108	1.00	IC LT1017CN8 COMPARATOR	A	U60
25114	1.00	IC LT1080 RS232 DRU/RECEIVER	A	U8
25130	3.00	IC 74AC373 OCTAL LATCH	A	U31-33
25131	1.00	IC 74AC08 QUAD 2-INPUT AND	B	U15
25132	2.00	IC 74AC138 1 OF 8 DECODER	B	U47,48
25133	1.00	IC CS5102 A/D 16BIT	A	U9
25135	1.00	IC 80C186-20 UP PLCC	B	[U30]
25136	1.00	IC DS1233-10 ECONO RESET	A	U29
28004	1.00	VOLT REF 2.5	C	U27
28043	1.00	VOLT REF 1.2 LT1004 +/-4MV	B	CR5
28058	1.00	TRANS ARRAY 2003 DARL 5V	B	U11
28064	3.00	IC STEPPER MOTOR DRIVER	B	U25,39,54
28073	1.00	IC DS1215 TIME CHIP PHANTOM	A	U40
28115	1.00	OP AMP TL072	B	U12
28116	1.00	VOLT REF 5V LT1021	A	U10
29002	1.00	IC 7523 8-BIT D-A CONVERT	A	U17
29084	3.00	IC D/A DUAL 7 BIT	C	U24,38,53
29106	2.00	IC 128KX8 CMOS STATIC RAM	H	U36,51
29130	2.00	IC AM29F040-120 512K FLSH MEM	A	U34,49
29131	1.00	TRANSZORB 33V 1.5KE33A	A	CR2
29132	2.00	IC FLASH MEM 128KX8	F	U35,50
31001	1.00	RES 2.10K OHM 1% 1/4W	B	R4
31300	6.00	RES 30.0 OHM 5% 1/4W	B	R51-56
32028	1.00	RES 49.90K OHM 1% 1/4W	B	R24
32039	1.00	RES 1.00M OHM 1% 1/4W	B	R14
32042	1.00	RES 10.00K OHM 1% 1/4W	B	R65

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330410

DESC: OBSOLETE SEE 7330415

REV: J

AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
32047	9.00	RES 1.000K OHM 1% 1/4W	B	R1,17,33,34,39,40,45,46,[67]
32085	4.00	RES 15.00K OHM 1% 1/4W	B	R28,41,42,50
32099	2.00	RES 10.00 OHM 1% 1/4W	B	R10,11
32112	3.00	RES 2.00K OHM 1% 1/4W	B	R21,23,63
32113	1.00	RES 4.02K OHM 1% 1/4W	B	R16
32140	1.00	RES 6.19K OHM 1% 1/4W	B	R18
32141	1.00	RES 6.65K OHM 1% 1/4W	B	R5
32158	1.00	RES 2.49M OHM 1% 1/4W	C	R62
32195	4.00	RES 22.10 OHM 1% 1/4W	B	R12,13,25,49
32228	1.00	RES 3.83K OHM 1% 1/4W	B	R3
32232	8.00	RES 200.00OHM 1% 1/4W	B	R6-8,15,20,26,27,66
32296	1.00	RES 3.32K 1% 1/4W	B	R2
33047	6.00	RES 1.00 OHM 1% 1W	B	R31,36-38,43,48
33074	1.00	RES 68 OHM 5% 1/2W	F	[R68]
35009	1.00	TRIMPOT 20K, 25T	A	RT1
37002	4.00	RESNET 10K OHM 5R 6P SIP	A	RN5-7,13
37007	3.00	RESNET 180 OHM 5R 10P SIP	A	RN2-4
37046	6.00	RESNET 10K SIP 10PIN 9RES 5%	A	RN1,8-12
37094	1.00	RES 10.00K OHM .1% 1/4W 5PPM	B	R61
38062	1.00	RES 75 OHM 5% 1 WATT	B	R64
38063	1.00	RES 29.4K .1% 1/4W	B	R60
42150	1.00	HEDR 12-P .100 RTANG BRKS	B	J9
42171	1.00	CONN 5PIN .1 RT ANGL	A	J3
42225	1.00	HEDR 3-P .156 LOK	A	J1
42269	1.00	HEDR 26P DUAL ROW 0.100	B	J5
42311	1.00	HEDR 14PIN .1X.1 FOR LCD	B	[]
42332	3.00	HEDR 4-P .100 RTANG POLARIZED	B	J2,7,8
42552	1.00	CONN 12P .049 RT STR RLF	A	J6
46082	1.00	FUSE RESETABLE 5A PCB MNT	A	F1
48225	1.00	LABEL WHITE .80 X .25	C	MARK WITH A PART NUMBER PCB
49014	9.00	TERM PCB	B	TP1-9
49149	2.00	SOCKET IC 28-PIN DIP	B	SOCKET FOR U37,52
49478	1.00	SOCKET 84-PIN PLCC	A	SOCKET FOR U30
49694	1.00	HEDR 10P .1	B	J4
49741	1.00	CRYSTAL 32.768KHZ	A	[Y1]
49743	1.00	CRYSTAL CLOCK OSC 32 MHZ	B	U28
62027	1.00	FILTER EMI SUPPR .5-1GHZ	A	U3
63018	2.00	INDUCTOR 220UH	A	[L1,2]
71022	0.01 FT	WIRE SOLID 24 AWG TEFLON	B	[A/R]

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330410

DESC: OBSOLETE SEE 7330415

REV: J

AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330400-TP	0.00	MAIN PCB ASBY	C	DOCUMENT ONLY
7330410-AS	0.00	-MAIN PCB (LESS FRONT END)	E	DOCUMENT ONLY
7330410-SC	0.00	-MAIN PCB (LESS FRONT END)	B	DOCUMENT ONLY
7330505	1.00	PCB W/SWAGES ASBY	A	
7330525	1.00	CABLE DAUGHTER PCB INTRCON	B	CABLE H
81004	10.00	CAP 100 UF 63V ELEC	A	C1,3,4,7,18,19,61,64,65,111
81006	1.00	CAP 470 uF 10V ELEC	F	C2
81021	1.00	CAP 680 UF 50V ELEC VERTICAL	C	C5
81027	2.00	CAP 10000UF ELECTROLYTIC	A	C117,[C118]
82003	6.00	CAP 10 uF 25V TANT	C	C32,34,38,68,71,116
82005	18.00	CAP 1uF 35V TANT	D	C8,10-17,20,25,26,33,93,99, 101,103,105
83021	1.00	CAP 1000 pF 200V DISC	A	C28
83023	1.00	CAP 100pF 200V DISC	A	C45
83049	4.00	CAP 33PF 100V CER	A	C113,114,22,23
84003	1.00	CAP .068 uF 100V FILM	A	C43
84039	8.00	CAP 820 PF 200V 10% X7R	A	C6,37,58,60,82,84,109,110
84054	3.00	CAP .0033UF FILM	A	C57,85,86
85002	1.00	CAP .01 uF 100V 1%	E	C115
85024	60.00	CAP .1UF 50V CER	A	C9,21,24,27,29-31,35,36 ,39-42, 44,46-49,51-56,59, 62,63, 66,67, 69,70,72-81, 83,87-92,94-98, 100,102,104,106-108,119
04018	1.00	LCD 2X24 SUPERTWIST DISPLAY	C	"[DSP1]"
12089	4.00	SCR PAN 2-56X1/4 SS PHIL	A	[]
16001	4.00	LKWSHR #2 HELICAL SPR	A	[]
32044	2.00	RES 20.00K OHM 1% 1/4W	B	R19,22
47049	1.00	BATTERY 3V LITHIUM COIN	A	"[BT1]"
47050	1.00	BATTERY HOLDER 3V LITH COIN	A	"[BT1 HOLDER]"
54005	1.00	SW DIP 4-SW SIDE-ACT	A	"[SW1]"
65020	1.00	BUZZER 3-16V PIEZO	C	"[BP1]"
7330200	1.00	FIRMWARE ASBY	C	['HIGH' IN U52] ['LOW' IN U37]
32126	1.00	RES 1.870K OHM 1% 1/4W	B	R9
42310	1.00	HEDR 14PIN FOR LCD MOUNTING	A	[J10]
37114	1.00	CERAMIC RESONATOR 2.00MHZ	A	Y2

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330413

DESC: PCB FRONT END UV CUR AMP ASBY

REV: F

AS OF: 6/29/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330413-SC	0.00	PCB FRONT END UV CUR AMP	A	DOCUMENT ONLY
7331404	1.00	PCB CURRENT AMP	C	
84041	2.00	CAP .1 UF 50V X7R SIZE 1206	A	C3,4
84056	2.00	CAP 100pf 100V CER 1206	A	C1,2
P481	0.00	CTG PROC,ASBY 7330414 PRCS	B	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330414

DESC: PCB FRONT END CUR AMP ASBY

REV: F

AS OF: 6/29/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330404-SC	0.00	PCB CURRENT AMP ASBY	A	DOCUMENT ONLY
7331404	1.00	PCB CURRENT AMP	C	
84041	2.00	CAP .1 UF 50V X7R SIZE 1206	A	C3,4
84056	2.00	CAP 100pf 100V CER 1206	A	C1,2
P481	0.00	CTG PROC,ASBY 7330414 PRCS	B	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330415

DESC: MAIN PCB ASBY

AS OF: 6/29/98

REV: E

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
04018	1.00	LCD 2X24 SUPERTWIST DISPLAY	C	#[DSP1]#
12089	4.00	SCR PAN 2-56X1/4 SS PHIL	A	[]
16001	4.00	LKWSHR #2 HELICAL SPR	A	[]
21010	3.00	DIODE IN5821 SCHTKY 30V 1/4W	B	CR1,3,4
23013	1.00	OP AMP LT1012CN8 SINGLE	B	U18
23021	1.00	VOLT REG +ADJ 1.5A 317	C	U5
23026	1.00	VOLT REG +5V 78L05A	A	U7
23029	1.00	VOLT REG -5V 79L05	A	U6
23072	1.00	VOLT REG LM2575T	C	U1
23092	1.00	VOLT REG ADJ LM2576 SWTCH	A	U2
25027	2.00	IC 74HC595 SHIFT REG 8BIT 3ST	B	U13,14
25051	1.00	IC 74LS04 HEX INVERTER	D	U41
25084	2.00	IC 74HC541 TS OCT BFR NONINV	E	U23,43
25086	5.00	IC 74HC574 OCTAL D FLIP-FLOP	C	U20,21,26,44,45
25094	1.00	IC L7662CPA NEG CONVERTER	B	U4
25106	1.00	IC 74AC245 OCTAL TRNSCEIVER	F	U22
25107	2.00	IC 74AC32 QUAD 2-INPT OR GATE	E	U16,42
25108	1.00	IC LT1017CN8 COMPARATOR	A	U60
25114	1.00	IC LT1080 RS232 DRU/RECEIVER	A	U8
25130	3.00	IC 74AC373 OCTAL LATCH	A	U31-33
25131	1.00	IC 74AC08 QUAD 2-INPUT AND	B	U15
25132	2.00	IC 74AC138 1 OF 8 DECODER	B	U47,48
25133	1.00	IC CS5102 A/D 16BIT	A	U9
25135	1.00	IC 80C186-20 UP PLCC	B	[U30]
25136	1.00	IC DS1233-10 ECONO RESET	A	U29
28004	1.00	VOLT REF 2.5	C	U27
28043	1.00	VOLT REF 1.2 LT1004 +/-4MV	B	CR5
28058	1.00	TRANS ARRAY 2003 DARL 5V	B	U11
28064	3.00	IC STEPPER MOTOR DRIVER	B	U25,39,54
28073	1.00	IC DS1315 TIME CHIP PHANTOM	B	U40
28115	1.00	OP AMP TL072	B	U12
28116	1.00	VOLT REF 5V LT1021	A	U10
29002	1.00	IC 7523 8-BIT D-A CONVERT	A	U17
29084	3.00	IC D/A DUAL 7 BIT	C	U24,38,53
29106	2.00	IC 128KX8 CMOS STATIC RAM	H	U36,51
29131	1.00	TRANSZORB 33V 1.5KE33A	A	CR2
29132	2.00	IC FLASH MEM 128KX8	F	U35,50
29142	2.00	IC AM29F040-120JC	B	[U34,U49]
31300	6.00	RES 30.0 OHM 5% 1/4W	B	R51-56
32028	1.00	RES 49.90K OHM 1% 1/4W	B	R24

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330415

DESC: MAIN PCB ASBY

AS OF: 6/29/98

REV: E

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
32039	1.00	RES 1.00M OHM 1% 1/4W	B	R14
32042	1.00	RES 10.00K OHM 1% 1/4W	B	R65
32044	2.00	RES 20.00K OHM 1% 1/4W	B	R19,22
32047	9.00	RES 1.000K OHM 1% 1/4W	B	R1,17,33,34,39,40,45,46,67
32085	4.00	RES 15.00K OHM 1% 1/4W	B	R28,41,42,50
32099	2.00	RES 10.00 OHM 1% 1/4W	B	R10,11
32112	3.00	RES 2.00K OHM 1% 1/4W	B	R21,23,63
32113	1.00	RES 4.02K OHM 1% 1/4W	B	R16
32140	1.00	RES 6.19K OHM 1% 1/4W	B	R18
32146	1.00	RES 10.70K OHM 1% 1/4W	B	R5
32158	1.00	RES 2.49M OHM 1% 1/4W	C	R62
32195	4.00	RES 22.10 OHM 1% 1/4W	B	R12,13,25,49
32228	1.00	RES 3.83K OHM 1% 1/4W	B	R3
32232	8.00	RES 200.00OHM 1% 1/4W	B	R6-8,15,20,26,27,66
32296	1.00	RES 3.32K 1% 1/4W	B	R2
33047	6.00	RES 1.00 OHM 1% 1W	B	R31,36-38,43,48
33074	1.00	RES 68 OHM 5% 1/2W	F	R68
35009	1.00	TRIMPOT 20K, 25T	A	RT1
37002	4.00	RESNET 10K OHM 5R 6P SIP	B	RN5-7,13
37007	3.00	RESNET 180 OHM 5R 10P SIP	A	RN2-4
37046	6.00	RESNET 10K SIP 10PIN 9RES 5%	A	RN1,8-12
37094	1.00	RES 10.00K OHM .1% 1/4W 5PPM	B	R61
37114	1.00	CERAMIC RESONATOR 2.00MHZ	A	Y2
38062	1.00	RES 75 OHM 5% 1 WATT	B	R64
38063	1.00	RES 29.4K .1% 1/4W	C	R60
42150	1.00	HEDR 12-P .100 RTANG BRKS	B	J9
42171	2.00	CONN 5PIN .1 RT ANGL	A	J3,J11
42225	1.00	HEDR 3-P .156 LOK	A	J1
42269	1.00	HEDR 26P DUAL ROW 0.100	B	J5
42310	1.00	HEDR 14PIN FOR LCD MOUNTING	A	[J10]
42311	1.00	HEDR 14PIN .1X.1 FOR LCD	B	[]
42332	3.00	HEDR 4-P .100 RTANG POLARIZED	B	J2,7,8
42552	1.00	CONN 12P .049 RT STR RLF	A	J6
46082	1.00	FUSE RESETABLE 5A PCB MNT	A	F1
47049	1.00	BATTERY 3V LITHIUM COIN	A	#[BT1]#
47050	1.00	BATTERY HOLDER 3V LITH COIN	A	"[BT1 HOLDER]"
48225	1.00	LABEL WHITE .80 X .25	C	MARK WITH A PART NUMBER PCB
49014	9.00	TERM PCB	B	TP1-9
	49149 2.00	SOCKET IC 28-PIN DIP B	B	SOCKET FOR U37,52

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330415

DESC: MAIN PCB ASBY

AS OF: 6/29/98

REV: E

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
49478	1.00	SOCKET 84-PIN PLCC	A	SOCKET FOR U30
49536	1.00	HEDR 2PIN .1	A	P1
49694	1.00	HEDR 10P .1	B	J4
49741	1.00	CRYSTAL 32.768KHZ	A	[Y1]
49743	1.00	CRYSTAL CLOCK OSC 32 MHZ	B	U28
49878	2.00	SOCKET 32 PIN PLCC	A	SOCKET FOR U34,U49
54005	1.00	SW DIP 4-SW SIDE-ACT	A	#[SW1]#
62027	1.00	FILTER EMI SUPPR .5-1GHZ	A	U3
65020	1.00	BUZZER 3-16V PIEZO	C	"[BP1]"
7330200	1.00	FIRMWARE ASBY	C	['HIGH' IN U52] ['LOW' IN U37]
7330400-TP	0.00	MAIN PCB ASBY	D	DOCUMENT ONLY
7330415-AS	0.00	-MAIN PCB ASBY	A	DOCUMENT ONLY
7330415-SC	0.00	-MAIN PCB ASBY	B	DOCUMENT ONLY
7330416	1.00	MAIN PCB W/SWAGES ASBY	A	
81004	10.00	CAP 100 UF 63V ELEC	A	C1,3,4,7,18,19,61,64,65,111
81006	1.00	CAP 470 uF 10V ELEC	F	C2
81021	1.00	CAP 680 UF 50V ELEC VERTICAL	C	C5
82003	6.00	CAP 10 uF 25V TANT	C	C32,34,38,68,71,116
82005	18.00	CAP 1uF 35V TANT	D	C8,10-17,20,25,26,33,93,99, 101,103,105
83021	1.00	CAP 1000 pF 200V DISC	B	C28
83023	1.00	CAP 100pF 200V DISC	B	C45
83049	4.00	CAP 33PF 100V CER	A	C113,114,22,23
84003	1.00	CAP .068 uF 100V FILM	B	C43
84039	8.00	CAP 820 PF 200V 10% X7R	A	C6,37,58,60,82,84,109,110
84054	3.00	CAP .0033UF FILM	A	C57,85,86
85002	1.00	CAP .01 uF 100V 1%	F	C115
85024	58.00	CAP .1UF 50V CER	A	C9,21,24,27,29-31,35,36,39 -42, 44,59,62,63,66,67,69,70 ,72-81, 83,87-92,94-98,100 ,102,104, 106-108,119,46- 48,52-56
32126	2.00	RES 1.870K OHM 1% 1/4W	B	R4,R9
63018	2.00	INDUCTOR 220UH	A	L1,L2
81027	2.00	CAP 10000UF ELECTROLYTIC	A	C117,118

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330500

DESC: GENERIC FINAL KIT

AS OF: 6/29/98

REV: T

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
14003	2.00	NUT HEX 4-40 STEEL	C	
14005	2.00	NUT HEX 8-32 SS	A	
16017	1.00	LKWSHR #10 HELICAL SPR SS	A	
16052	2.00	WSHR .187ID .312OD .050THKNY	A	
17031	1.00	WSHR FENDER #8X.75X.060 SZ	A	
17056	1.00	WSHR FL .219IDX.438ODX.049 SS	A	
17059	4.00	WSHR FL .188IDX.375ODX.049 SS	A	
18034	2.00	WSHR SPRING WAVE #4 SS	B	
19055	1.00	SCR SOCK CAP 6-32X5/8 BLK	A	
19112	2.00	SCR SOCK CAP 4-40X3/8 SS	B	
19170	5.00	SCR SOCK CAP 6-32X5/16 SS	A	
19189	2.00	SEMS 6-32X3/8 ST PHIL ITOOTH	A	
19335	2.00	SCR SOCK CAP 8-32 X 3/4 BLK	A	
42210	2.00	SCREWLOCK FM/25P SUB D	A	
49166	4.00	FOOT RUBBER CONE BLACK	A	
49539	2.00	CLIP WIRE PVC SELF ADHESIVE	A	
49845	1.00	RUBBER FOOT .81" DIA,GREY,PSA	A	
71154	1.00	FLEX CIRCUIT 12 COND 8.00" SR	A	
7330401	1.00	MOVING INTCON PCB ASBY	A	
7330502	1.00	CABLE MOTOR Y AXIS ASBY	C	CABLE A
7330503	1.00	CABLE POWER INPUT ASBY	D	CABLE B
7330506	1.00	CABLE OPTO 14L ASBY	B	CABLE E
7331004	1.00	OVRLY REAR	A	
7332006	1.00	SHAFT Y-AXIS	B	
7332008	1.00	SPRING MICROPLATE RETAINING	C	
7332011	1.00	COVER BOTTOM	D	
7332021	1.00	SPACER FILTER WHEEL MOTOR	A	
7332027	1.00	POST FILTER WHEEL	C	
7332029	1.00	BRACKET CARRIER ASBY	C	
7332035	2.00	WSHR TOP COVER LOCATING	A	
7332042	2.00	BLOCK SHAFT SUPPORT	A	
7332080	4.00	SHIM OPTICS ARM	A	
7332084	1.00	SPRING LENS RETAINING	A	
7332085	1.00	SPACER DETECTOR PCB	A	
7332087	5.00	SPACER FF COVER BOTTOM	B	
7332516	0.00	JIG RUBBER FOOT PLACEMENT	A	DOCUMENT ONLY
7333002	1.00	CABLE ASBY RS232 INTFC 486CPU B		
75049	1.00	CABLE PARLLEL PORT DB25-13X2 A		
49128	6.00	SPCR FF 6-32X.25L HEXAL	B	
17033	2.00	WSHR FLAT #4 .125X.250 SS	A	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330500

DESC: GENERIC FINAL KIT

REV: T

AS OF: 6/29/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16002	4.00	LKWSHR #4 HELICAL SPR SS	A	
16003	12.00	LKWSHR #6 HELICAL SPR SS	A	
17055	4.00	WSHR FL .156IDX.375ODX.049 SS	A	
19145	2.00	SCR SOCK CAP#4-40X1/4" SS	A	
19017	1.00	SCR SOCK CAP 8-32X3/8 BLK	A	
19331	4.00	SPCR MF 8-32X1.625 STEEL HEX	A	
7332028	1.00	SPACER TENSION ARM	C	
7120595	1.00	IDLER PULLEY ASBY	B	
17003	4.00	WSHR FL .156IDX.312OD	B	
7332020	1.00	ARM BELT TENSION	B	
7332004	1.00	SPRING TORSION	B	
16016	8.00	LKWSHR #8 HELICAL SPR SS	A	
17054	7.00	WSHR FL .188IDX.438ODX.049 SS	C	
7332001	1.00	FILTER PHOTO DETECTOR BG-18	A	
7332024	1.00	HOLDER OPTICAL SENSOR	B	
3402000	1.00	LENS, BICONVEX BK7	C	
19143	4.00	SCR SOCK CAP#8-32X1/2 SS	A	
19186	14.00	SEMS 6-32X1/4 ST PHIL ITOOTH	A	
66006	0.01	LOCTITE 242 BLUE	A	A/R
66033	0.01	LOCTITE INSTANT GEL	C	A/R
18038	4.00	WSHR .130IDX.250ODX.020T NYL N	A	
7332031	1.00	SPCR,FF,CVR,BTM,RELIEVED	D	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330501

DESC: CABLE LAMP ASBY

REV: C

AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42374	2.00	TERM CRIMP PIN 22AWG GOLD	B	USED ON CABLE "C"
42381	1.00	CONN 4-P .100 RCPT	A	USED ON CABLE "C"
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE "C"
49380	1.00	BULB 3.5V .45AMP	F	USED ON CABLE "C"
7330501-AS	0.00	-CABLE LAMP ASBY	C	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330502

DESC: CABLE MOTOR Y AXIS ASBY

REV: C

AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
19169	1.00	CLIP,EXTRNL RETAN RING .25	A	USED ON CABLE "A"
3122023	1.00	MOTOR,STPR 1.8DEG,FLAT SHAFT G		USED ON CABLE "A"
4032126	1.00	PULE,TIMBLT 18TOOTH MOLDED D		USED ON CABLE "A"
42375	4.00	TERM CRIMP SOC 22AWG GOLD	B	USED ON CABLE "A"
42377	1.00	CONN 4-S .100 22-28GA RCPT	B	USED ON CABLE "A"
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE "A"
71035	0.21 FT	SHRINK TUBE 1/4"	A	2.5", USED ON CABLE "A"
7330502-AS	0.00	-CABLE MOTOR Y AXIS ASBY	C	DOCUMENT ONLY
42058	1.00	TIE WRAP 3"	A	USED ON CABLE "A"

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330503

DESC: CABLE POWER INPUT ASBY

REV: D

AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42086	2.00	TERM FTAB .25 22-18 INS TL1	C	USED ON CABLE "B"
42177	1.00	INDS 3-S .156 18GA	A	USED ON CABLE "B"
42551	1.00	CONN DC INPUT 5.5X2.1MM	B	USED ON CABLE "B"
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE "B"
54013	1.00	SW SPST ROCKER PANEL MNT	B	USED ON CABLE "B"
71093	1.10 FT	WIRE 18AWG UL1007 RED	B	4.0",3.5",5.0"
7330503-AS	0.00	-CABLE POWER INPUT ASBY	D	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
 PART: 7330504
 DESC: CABLE LAMP EXTENSION ASBY
 AS OF: 7/11/98

REV: D

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42477	4.00	TERM CRIMP FEMALE 22-26AWG	B	USED ON CABLE "D"
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE "D"
71024	0.25 FT	SHRINK TUBE 1/8"	B	3", USED ON CABLE D
71108	0.38 FT	WIRE 22AWG UL1007 BLUE	B	4.5", USED ON CABLE D
7330504-AS	0.00	-CABLE LAMP EXTENSION ASBY	D	DOCUMENT ONLY
42480	2.00	CONN 4P POL/LAT .1 UNLOAD RCTA		USED ON CABLE "D"
71101	0.38 FT	WIRE 22AWG UL 1007 BLACK	B	4.5", USED ON CABLE D

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330506

DESC: CABLE OPTO 14L ASBY

REV: B

AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
28030	1.00	SW OPTO SLTTD W/LDS LOGIC TABS	F	USED ON CABLE "E"
42477	5.00	TERM CRIMP FEMALE 22-26AWG	B	USED ON CABLE "E"
42481	1.00	CONN 5P POL/LAT .1 UNLOAD RCT A	USED	ON CABLE "E"
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE "E"
7330506-AS	0.00	-CABLE OPTO 14L ASBY	B	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330507

DESC: CABLE X AXIS MOTOR

REV: A

AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42365	4.00	TERM .100 24-30GA GOLD	B	USED ON CABLE F
42377	1.00	CONN 4-S .100 22-28GA RCPT	B	USED ON CABLE F
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE F
68019	1.00	MOTOR STEPER SIZE 17 SGL SFT	D	USED ON CABLE F
71035	0.25 FT	SHRINK TUBE 1/4"	A	3", USED ON CABLE F
7330507-AS	0.00	-CABLE X AXIS MOTOR	A	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330508

DESC: MECH PRE ASSEMBLED ASBY

REV: M

AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
18041	1.00	SCR SET 2-56X3/32 SS CUPPT	A	
2872266	1.00	FLTR WHEEL DRIVE GEAR MOD	B	
7330508-AS	0.00	-MECH PRE ASSEMBLED ASBY	C	DOCUMENT ONLY
7330515	1.00	CARRIER ASBY	F	
7330522	1.00	OPTIC ARM ASBY	C	
8050509	1.00	CABLE FLTR WHEEL MTR ASBY	B	CABLE BJ
66006	0.01	LOCTITE 242 BLUE	A	A/R

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330509

DESC: CABLE LAMP UV ASBY

REV: A

AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330509-AS	0.00	-CABLE LAMP UV ASBY	A	DOCUMENT ONLY
42374	2.00	TERM CRIMP PIN 22AWG GOLD	B	USED ON CABLE G
42381	1.00	CONN 4-P .100 RCPT	A	USED ON CABLE G
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE G
49763	1.00	BULB 4.0V 1.20 AMP	A	USED ON CABLE G

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330522

DESC: OPTICS ARM ASBY

REV: C

AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16002	2.00	LKWSHR #4 HELICAL SPR SS	A	
17033	2.00	WSHR FLAT #4 .125X.250 SS	A	
19105	1.00	SCR SET 6-32 X 1/8 CUPPT SS	A	
19145	4.00	SCR SOCK CAP#4-40X1/4" SS	A	
3012010	2.00	RETAINER BULB	A	
42058	1.00	TIE WRAP 3"	A	
49554	1.00	MOUNT CABLE TIE PAD .5 X .5	A	
7330501	1.00	CABLE LAMP ASBY	C	CABLE C
7330504	1.00	CABLE LAMP EXTENSION ASBY	D	CABLE D
7330522-AS	0.00	-OPTIC ARM ASBY	B	DOCUMENT ONLY
7332023	1.00	RETAINER MIRROR	A	
7332025	1.00	RING LENS RETAINING	B	
7332032	1.00	LENS OPTICAL	A	
7332033	1.00	MIRROR OPTICAL	B	
7332081	1.00	ARM OPTICAL MACHINED	A	
66006	0.01	LOCTITE 242 BLUE	A	A/R

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330523

DESC: OPTIC ARM UV ASBY

REV: C

AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16002	2.00	LKWSHR #4 HELICAL SPR SS	A	
17033	2.00	WSHR FLAT #4 .125X.250 SS	A	
19105	1.00	SCR SET 6-32 X 1/8 CUPPT SS	A	
19145	2.00	SCR SOCK CAP#4-40X1/4" SS	A	
19186	2.00	SEMS 6-32X1/4 ST PHIL ITOOTH	A	
19218	2.00	SEMS 4-40X1/2 ST PHIL ITOOTH	A	
3090064	2.00	OVRLY 309 TEMP WARNING	A	
42058	1.00	TIE WRAP 3"	A	
49080	2.00	SPACER MF 6-32X.750 SS HX	C	
49221	2.00	SPACER THRU #4X.250 ALBRD	A	
49554	1.00	MOUNT CABLE TIE PAD .5 X .5	A	
7330504	1.00	CABLE LAMP EXTENSION ASBY	D	CABLE D
7330509	1.00	CABLE LAMP UV ASBY	A	CABLE G
7330523-AS	0.00	-OPTIC ARM UV ASBY	B	DOCUMENT ONLY
7332023	1.00	RETAINER MIRROR	A	
7332025	1.00	RING LENS RETAINING	B	
7332032	1.00	LENS OPTICAL	A	
7332033	1.00	MIRROR OPTICAL	B	
7332054	2.00	RETAINER BULB	C	
7332056	1.00	COVER OPTIC ARM	A	
7332082	1.00	ARM OPTICAL MACHINED UV	A	
66006	0.01	LOCTITE 242 BLUE	A	A/R
66033	0.01	LOCTITE INSTANT GEL	C	A/R

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS

PART: 7330524

DESC: OPTIC ARM NARROW BEAM ASBY

REV: C

AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16002	2.00	LKWSHR #4 HELICAL SPR SS	A	
17033	2.00	WSHR FLAT #4 .125X.250 SS	A	
19105	1.00	SCR SET 6-32 X 1/8 CUPPT SS	A	
19145	2.00	SCR SOCK CAP#4-40X1/4" SS	A	
19186	2.00	SEMS 6-32X1/4 ST PHIL ITOOTH	A	
19218	2.00	SEMS 4-40X1/2 ST PHIL ITOOTH	A	
3090064	2.00	OVRLY 309 TEMP WARNING	A	
42058	1.00	TIE WRAP 3"	A	
49080	2.00	SPACER MF 6-32X.750 SS HX	C	
49221	2.00	SPACER THRU #4X.250 ALBRD	A	
49554	1.00	MOUNT CABLE TIE PAD .5 X .5	A	
7330504	1.00	CABLE LAMP EXTENSION ASBY	D	CABLE D
7330509	1.00	CABLE LAMP UV ASBY	A	CABLE G
7330524-AS	0.00	-OPTIC ARM NB ASBY	B	DOCUMENT ONLY
7332023	1.00	RETAINER MIRROR	A	
7332033	1.00	MIRROR OPTICAL	B	
7332043	1.00	SPACER LENS	B	
7332044	1.00	HOLDER LENS	B	
7332047	2.00	LENS OPTICAL NARROW BEAM	B	
7332054	2.00	RETAINER BULB	C	
7332056	1.00	COVER OPTIC ARM	A	
7332083	1.00	ARM OPTICAL MACHINED NB	A	
66006	0.01	LOCTITE 242 BLUE	A	A/R
66033	0.01	LOCTITE INSTANT GEL	C	A/R

Service Parts List

ELX800	19337	Screw, 6-32 x 1 1/4
ELX800	28114	Photodiode, TO5
ELX800	41038	Belt, Timing, X
ELX800	41039	Belt, Timing, Y
ELX800	49746	Bungie Cord
ELX800	49748	Screw, 8-32 x 3/8
ELX800	54013	Switch, SPST, Rocker
ELX800	61062	Power Supply, 24 VDC
ELX800	68019	Stepper Motor, X-Axis
ELX800	68020	Motor, Filter Wheel
ELX800	71154	Flex Cable
ELX800	98145	Screw Driver
ELX800	99204	Rubber Band
ELX800	2872086	Filter Wheel Plug
ELX800	3122023	Stepper Motor, Y-Axis
ELX800	3402000	Lens, Biconvex
ELX800	7330202	Base Code, F/W
ELX800	7330203	Assay Config, F/W
ELX800	7330400	See 7330415
ELX800	7330401	Moving Intercon Asby
ELX800	7330404	See 7330414
ELX800	7330405	See 7330413
ELX800	7330410	PCB, Main (Obsolete see 7330415)
ELX800	7330413	PCB, Current Amp, UV
ELX800	7330414	PCB, Current Amp
ELX800	7330415	PCB, Main (Less Front End)
ELX800	7330513	Lamp Asby w/ Wrench
ELX800	7330516	Lamp Asby for UV/NB units
ELX800	7331001	Overlay, Kybd
ELX800	7331005	ELx800 Service Manual
ELX800	7332009	Cover, Top
ELX800	7332013	Carrier, Microplate
ELX800	7332032	Lens, Optical
ELX800	7332033	Mirror, Optical
ELX800	7332041	Stopping Block
ELX800	7332500	Filter Wheel Motor Spacer Jig
ELX800	7332508	Autocal Jig
ELX800	7332515	Go/NoGo Jig (STD/UV only)
ELX800	7332514	Go/NoGo Jig (NB only)
ELX800	8050517	Cable, Motor Asby
ELX800	8290202	Define Reader Protocol Install
ELX800	04018	Display, 2 x 24

